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**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

2013-1341

PATENT HARBOR, LLC,  
Plaintiff-Appellant,

v.

AUDIOVOX CORPORATION and AUDIOVOX ELECTRONICS CORPORATION,  
Defendants-Appellees,  
and

RADIOSHACK CORPORATION,  
Defendant-Appellee,  
and

VIZIO, INC.,  
Defendant-Appellee,  
and

IMATION CORPORATION,  
Defendant-Appellee,  
and

BEST BUY CO., INC.,  
Defendant-Appellee,  
and

DENON ELECTRONICS (USA), LLC,  
Defendant-Appellee.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF  
TEXAS IN CASE NO. 10-CV-0361, MAGISTRATE JUDGE JOHN D. LOVE.

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**CERTIFICATE OF INTEREST**  
**(Fed. Cir. R. 47.4)**

Counsel for the Plaintiff-Appellant Patent Harbor, LLC certifies the following:

The full name of every party or amicus represented by me is: Patent Harbor, LLC.

Patent Harbor, LLC is the real party in interest.

Parent company Brandel, LLC wholly owns Patent Harbor, LLC. No publicly held companies hold more than 10% of the stock of Patent Harbor, LLC.

The names of all law firms and the partners or associates that appeared for Patent Harbor, LLC in the District Court or are expected to appear in this Court are:

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Dated: 6/21/2013

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**STATEMENT OF RELATED CASES**  
**(Fed. Cir. R. 47.5)**

No other appeal in or from the underlying civil action in this case has been previously before this Court or any other appellate court. No case known to counsel for Plaintiff-Appellant is pending in this or any other court that would directly affect or be directly affected by this Court's decision in the pending appeal.

## **STATEMENT OF JURISDICTION**

The jurisdiction of the District Court in this patent infringement action was premised on 28 U.S.C. § 1338(a). This District Court entered final judgment disposing of all parties' claims on March 21, 2013, and a Notice of Appeal was timely filed on April 19, 2013. The jurisdiction of this Court is premised on 28 U.S.C. § 1295(a)(1).



## **STATEMENT OF ISSUES FOR REVIEW**

Whether the District Court erred in construing the term “controllable image generator” in claim 2 of U.S. Patent No. 5,977,992 (“the ‘992 patent”).

## **STATEMENT OF THE CASE**

This appeal was taken by Plaintiff-Appellant Patent Harbor, LLC (“Patent Harbor”) after the Eastern District of Texas entered final judgment of non-infringement of the ‘992 patent in favor of Defendants-Appellees Audiovox Corporation, Audiovox Electronics Corporation, RadioShack Corporation, Vizio, Inc., Imation Corporation, Best Buy Co., Inc., and Denon Electronics (USA), LLC (collectively, “Defendants-Appellees”). (A35).

Magistrate Judge Love construed “controllable image generator” of claim 2 of the ‘992 patent (as well as other terms not relevant to this appeal) in his order of October 24, 2011 (A17-22), which construction was adopted by District Court Judge Davis on March 16, 2012 (A33-34). On the basis of this claim construction, the parties stipulated that Defendants-Appellees’ products did not infringe claim 2 of the ‘992 patent, and Judge Davis entered this joint stipulation on April 26, 2012, without prejudice to Patent Harbor’s right to appeal the claim construction to this Court. (A3159-3161). Final judgment was entered based upon the joint stipulation on March 21, 2013. (A35). This appeal follows.

## **STATEMENT OF THE FACTS**

### **A. Introduction**

The '992 patent deals generally with content addressable video. Content addressable video is, as its name implies, recorded video that is accessible based on a representation of the content in the video.

Defendants-Appellees make and sell DVD or Blu-Ray players for playing video disks containing movies for example. These players are alleged to infringe claim 2 of the '992 patent because they are programmed to allow a user to address video image data stored on such video disks based on their content.

Specifically, the accused players provide scene selection menus. A scene selection menu allows a user to "jump" to a particular point or scene in the movie on the disk. When the scene selection menu is displayed on a user's TV screen for example, scenes are displayed with some indication of the content of the video image data at that scene, such as a still picture found at that scene, a small clip of moving video appearing within that scene, a textual description of what is occurring at that scene, etc. The user, assisted by the content indication, can use a cursor to select one of the displayed scenes (e.g., the wedding scene) using buttons on the player or a wireless remote control sold with the player. This causes the player to generate an address where the wedding scene is stored on the video disk, which

address is used to access the video image data on the disk and to start playing the wedding scene on the TV. As such, the video image data (the wedding scene) is addressed based on its content (as indicated in the scene selection menu).

## **B. The ‘992 Patent**

Content addressable video of the type disclosed in the ‘992 patent has proven to be a significant advent, as it allows a user to select and view desired stored video data content quickly. Without content addressable video, a user desiring to view particular content in stored video data would have to randomly search the video data for the desired content, or otherwise remember where such desired content was and “fast forward” to it.

Several different examples of content addressable video are discussed in the ‘992 patent. In one example, content addressable video in the ‘992 patent is exemplified with respect to video of an object, such as a transmission of an automobile. Col. 2, ll. 44-46 (A155). In this example, the content addressable video can comprise different perspective views of the object, such as video image data showing the object from the right or left, top or bottom, etc. Col. 2, ll. 49-54 (A155). In another example, content addressable video is exemplified with respect to video of a geographic area, such as a highway system, col. 5, ll. 14-16 (A157), comprising views taken at different locations along the highway, col. 5, ll. 18-25 (A157). In yet another example, content addressable video is exemplified with

respect to video of an event, such as a person's hands while playing piano chords in a musical sequence. Col. 9, ll. 63-64 (A159).

The recorded video image data is content addressable in the '992 patent through use of a "content video image." Col. 2, l. 64 to col. 3, l. 2 (A155-156). The content video image is akin to the scene selection menus provided by the accused players. It comprises a virtual, displayed depiction of the content of the underlying video image data that a user can select to view. Col. 2, ll. 14-28 (A155). For instance, the content video image can comprise a map indicating different positions relative to the object, col. 4, ll. 24-29 (A156), or different locations along the highway system that a user can select to view, col. 5, ll. 18-32 (A157). In the music sequence example, the content video image can display a depiction of the filmed musical sequence, including the chords in the sequence that a user can select to view the portion of the video showing how his hands should be positioned when playing that particular chord.<sup>1</sup> Col. 11, ll. 40-44 (A160).

An example of the content video image for the musical sequence is shown in Figure 6 of the '992 patent, including the chords (Cm, Cm#7, etc.) used to indicate

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<sup>1</sup> The '992 patent notes that providing content addressable video of music sequence in this fashion might be useful in training a musician in proper hand placement when transitioning between chords in the sequence. Col. 9, ll. 61-67 (A159).

the content of the stored hand-placement musical-sequence video that the user can view:

Content Image With Graphic Space

```

Cm --- ( * * * * ) ----- Cm#7 ----- Cm7 ----- F9
Are we really    happy    with    this    lonely    game    we play ? ...

Cm ----- A -- b7 -- G7 ---- Cm ----- Cm#7
Looking    for    words    to    say ... searching    but    not    finding

----- Cm7 ----- F9
understanding    anyway    ..

```

FIG. 6

(A154).

A moveable cursor on the content video image allows the user to select the content of the stored video image data—for example, a particular angled view of the object (right or left, top or bottom), col. 4, ll. 24-29 (A156), a particular location along the highway system, col. 5, ll. 18-48 (A157), or proper hand placement of the selected chord, col. 11, ll. 40-44 (A160).

The video image data associated with that selection is addressed and the associated video images are retrieved and displayed to the user.<sup>2</sup> Thus, video image

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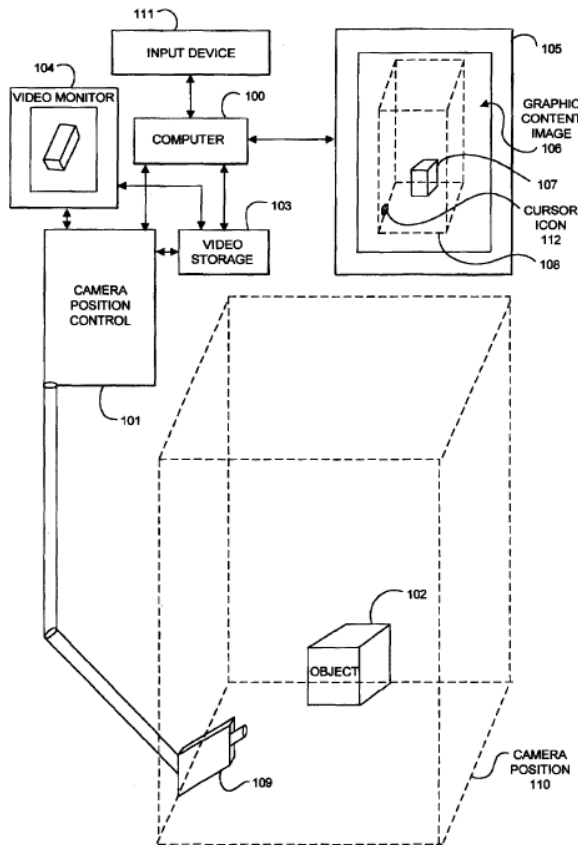
<sup>2</sup> See col. 1, ll. 41-45 (A155) (“To access video based on content, a user moves a cursor to a position on the virtual space [of the content video image]. In response to the position of the cursor on the virtual space, a video frame is accessed which has a content indicated by the position of the cursor.”).

data (showing various perspective views of the object; various locations along the highway; or hands playing a particular chord) is addressed based on its content (as indicated by the cursor position in the content video image; the locations in the content video image; or the chords displayed on the content video image).

The written description of the '992 patent discloses systems and methods for *creating* content addressable video and for *playing* content addressable video once it is has been created. Patent Harbor contends that claim 2 of the '992 patent at issue in this appeal is directed to a system for playing content addressable video. Nonetheless, to better understand content addressable video, its creation is briefly discussed first.

### **1. Creation of Content Addressable Video**

The creation of content addressable video is described with respect to the system illustrated in Figure 1 of the '992 patent, which is reproduced below:

**'992 PATENT, FIGURE 1 (A150)**

The '992 patent discloses two ways of creating content addressable video, both of which may be accomplished using the system of Figure 1. Col. 3, ll. 30-31 (A156). These creation methods differ in whether a content video image 106 is created before or after video images of the object, geographic area, or event are captured and stored as video image data. Col. 2, ll. 29-33 (A155).

In accordance with a first method for creating content addressable video,<sup>3</sup> the camera 109 first captures video images of an object, geographic area, or event, followed later by the creation of the content video image 106. Col. 4, ll. 1-4

<sup>3</sup> See Fig. 4, steps 400-403 (A153).



(A156). Once the captured frames of video images are stored in video storage 103 as frames of video image data, keys (also called “tags” in the ‘992 patent) are assigned to the frames (or frame segments), which keys for example “may correspond to geographic position stamps” of the location of the camera 109 at the time it logged the video images,<sup>4</sup> col. 5, ll. 18-21 (A157), or which mark the frames when transitions between chords appear in the video for example, col. 11, ll. 20-22 (A160).

Next, a content video image 106 (labeled as a “graphic content image” 106 in Figure 1) is created<sup>5</sup> “based on the assigned keys.” Col. 5, ll. 26-27 (A157). In one example, the keys are used to compile a “map” (*see* grid 108 in Fig. 1; or Fig. 6, shown above) “in which each key has a corresponding position on the map.” Col.

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<sup>4</sup> Note that the camera 109 need not be robotically attached to the remainder of the system in Figure 1, as the examples of the filmed highway system and piano playing should make clear.

<sup>5</sup> A software drawing or graphics program can be used to form the content video image. Col. 5, l. 66 to col. 6, l. 5 (A157).

5, ll. 29-30 (A157). This resulting content video image 106 can be displayed on a content video monitor 105.<sup>6</sup>

Thereafter, the stored video image data is compiled “for addressing in response to the assigned key[s].” Col. 5, ll. 33-34 (A157). Specifically, “[t]he generated content [video] image is used to compile the video frames by identifying positions on the content image of adjacent keys, and storing the video frames at addresses indicated by the keys.” Col. 5, ll. 34-38 (A157). In other words, the keys are used to link positions in the content video image and the stored frames of video image data, such that when a position in the content video image is selected, the correct frames of video image data are accessed.

When using the second creation method,<sup>7</sup> a content video image 106 is constructed, followed by the capture of video images using the content video image essentially as a guide for filming. This second creation method is illustrated in the

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<sup>6</sup> This first content addressable video creation process is exemplified in the ‘992 patent as follows:

If a plurality of frames of video data comprise film of a geographic area, each frame can be tagged with a position stamp, indicating the position of the camera when it was taken, and the focal point of the camera. This position stamp can then be translated automatically to a virtual position on a map. The map superimposed with the virtual positions of all the video frames in the plurality then constitutes the content video image.  
Col. 2, ll. 15-23 (A155).

<sup>7</sup> See Fig. 3, steps 300-304 (A152).

‘992 patent with respect to filming the object 102 discussed earlier (e.g., the automobile transmission).

After the content video image 106 of the to-be-filmed object 102 is created, computer 100 assigns “keys to positions in the content [video] image,” which can corresponds to X, Y, and Z positions on the grid 108. Col. 4, ll. 44-47 (A156). These keys are then used by the computer 100 to generate position control signals for the robotic camera 109 to capture video images and store video image data of the object 102 from various perspectives. Col. 4, ll. 48-50 (A156). Movement of the camera 109 can be facilitated by an input device 111, such as a mouse, which allows a user to move a cursor 112 along the grid 108 in the content video image 106 to control the position of the camera 109, which will cause keys to be associated with the recorded video image data from the proper perspective.<sup>8</sup>

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<sup>8</sup> This second content addressable video creation process is exemplified in the ‘992 patent as follows:

Assume that one wanted to generate a content addressable video-library of an object, such as the transmission of an automobile. A content video image would then be graphically created in which an icon representing the transmission is placed in a virtual graphic space. A grid, three dimensional, or two dimensional, is then drafted using computer software graphics packages, to create a grid indicating the perspective of the transmission to be filmed. Thus, each position in the grid would correspond to a frame of video data depicting a different perspective of the transmission.

Col. 2, ll. 44-54 (A155).

Once the video images are captured by the camera 109 and stored in video storage 103 as video image data, the keys are stored with the video image data, and the stored frames of video image data are compiled in a format to facilitate their access in response to the keys. Col. 4, ll. 52-57 (A156). This allows the stored video image data to be played back later using the content video image, col. 5, ll. 1-5 (A157), which is discussed next.

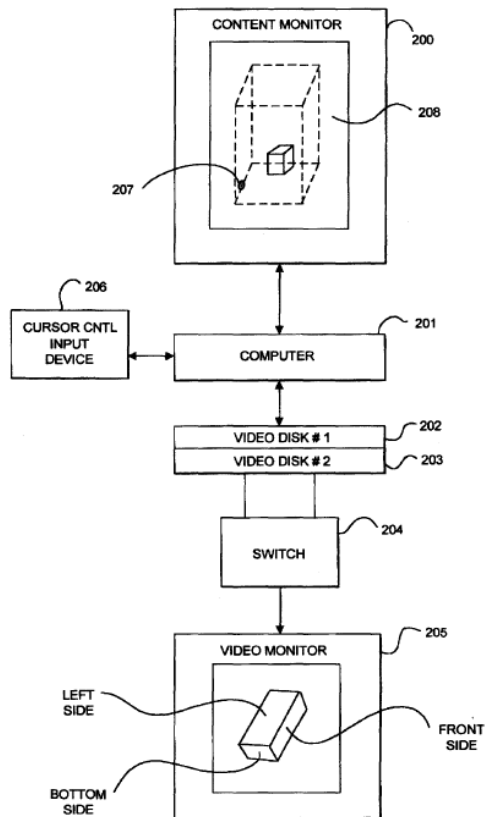
## **2. Playback of Content Addressable Video**

Both of the above methods for creating content addressable video result in a content video image and stored video image data that are linked by the keys and the compiling processes just discussed. This allows the user to use the content video image to choose relevant portions of the video to be played back via the indicated content.

Figure 2 of the '992 patent illustrates a system for playing back content addressable video, which specifically illustrates playback of the previously-filmed object 102:<sup>9</sup>

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<sup>9</sup> “FIG. 2 illustrates the preferred system for displaying the content addressable video according to the present invention.” Col. 4, ll. 15-17 (A156).

**'992 PATENT, FIGURE 2 (A151)**

In the system illustrated in Figure 2, desired video content can be displayed on video monitor 205 by selecting a position in the previously-created content video image 208 of the object displayed on the content monitor 200. Col. 4, ll. 24-29 (A156). (Alternatively, the content video image 208 displayed in monitor 200 could comprise a map of the geographical area, or the content video image of Figure 6 depicting the musical sequence). A user can use an input device 206 (again for example, a mouse) coupled to a computer 201 to move a cursor 207 in the content video image 208 to a selected position relative to the depicted object. Col. 4, ll. 24-26 (A156).

In response, video image data corresponding to the selected position is retrieved from video disks within either of two video disk players 202 and 203,<sup>10</sup> and the video image data is used by the selected player to generate video images for display on the video monitor 205 that correspond to the perspective of the object from that selected position's vantage point. Col. 4, ll. 26-29 (A156). This is possible because, as noted earlier, the positions in the content video image were linked to addresses of the video image data using keys (i.e., tags). Col. 5, ll. 2-4 (A157). Thus, just as the cursor 207 is shown in the content video image 208 as positioned to the bottom, left, and front of the depicted object in Figure 2, video monitor 205 displays the stored video image data of the object from that same perspective. *See* Fig. 2 (A151) and col. 4, ll. 29-33 (A156).

The '992 patent, when discussing playback and Figure 2, notes that further implementation details can be found in U.S. Patent 4,857,902 ("the '902 patent").<sup>11</sup>

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<sup>10</sup> A switch 204 is controlled by computer 201 to select video from one of the appropriate players 202 and 203 as necessary. Col. 4, ll. 19-21 (A156).

<sup>11</sup> *See* col. 4, ll. 34-36 (A156) (noting in the discussion of Figure 2 that "[b]ackground concerning how to implement these interactive display systems can be found in the above cross-referenced U.S. Pat. No. 4,857,902.").

### 3. Asserted Claim 2 of the ‘992 Patent

Asserted claim 2 of the ‘992 patent recites the following, including the “controllable image generator” limitation that is the subject of this appeal:

2. An apparatus for generating content addressable video, comprising:
  - a content image display which displays a content video image representative of an organization of content addressable video, the content video image having positions within the content video image corresponding to desired content of video images to be displayed;
  - a controller, in communication with the content image display, which generates control signals indicating content for video images in response to respective positions within the content video image; and
  - controllable image generator***, responsive to the control signals, which produces video images in response to video image data indicated by the control signals corresponding to respective positions in the content video image.

Col. 14, ll. 49-64 (A161) (emphasis added). How these limitations properly map to structures in the playback system of Figure 2 is discussed later.

### C. The Parent ‘514 Patent

The ‘992 patent is a continuation of USP 5,684,514 (“the ‘514 patent”), and both patents share a common written description. The parent ‘514 patent was asserted in this case and claim 1 was adjudicated infringed and not invalid at a jury trial in December 2012. The ‘514 patent is not the subject of the claim construction appeal taken here.

Nonetheless, certain claims of the ‘514 patent were referenced in Defendants-Appellees’ arguments before the District Court, and in the District Court’s construction of “controllable image generator” in asserted claim 2 of the ‘992 patent. These claims from the ‘514 patent are reproduced below, and their relevance will be discussed later:

3. An apparatus for generating content addressable video, comprising:

- a content image display which displays a content video image representative of an organization of content addressable video, the content video image having positions within the content video image corresponding to desired content of video images to be displayed;
- a controller, in communication with the content image display, which generates control signals indicating content for video images in response to respective positions within the content video image;
- controllable video image generator, responsive to the control signals, which produces f[r]ames of video data, each frame determining a video image having the content indicated by the control signals corresponding to the respective position in the content video image;
- video storage which stores f[r]ames of video data generated by the controllable video image generator in storage locations having addresses; and
- data processing resources, the controllable video image generator and the controller, including resources that execute program steps which associate the addresses of the stored f[r]ames of video data with respective positions in the content video image.

4. The apparatus of claim 3, wherein the controllable video image generator comprises a robot mounted video camera.

‘514 patent, col. 14, ll. 1-28 (A147).



#### **D. The Proceedings Before the District Court**

On July 21, 2010, Patent Harbor brought suit against Defendants-Appellees in the Eastern District of Texas asserting, *inter alia*, infringement of claim 2 of the ‘992 patent based on manufacture and sales of DVD and Blu-Ray video disk players that provide scene selection menus.

Of sole interest to the present appeal is the construction of the term “controllable image generator” in claim 2 of the ‘992 patent, and thus only the proceedings relevant to that limitation are set forth.

As the following will show, Patent Harbor asserted that claim 2 was directed to an apparatus for *playback* of content addressable video such as appears in Figure 2 of the ‘992 patent, and that the “controllable image generator” of that claim was a controllable video *playback* device, as exemplified by players 202/203 in the playback system of Figure 2.

Defendants–Appellees, by contrast, asserted that claim 2 was directed to an apparatus for the *creation* of content addressable video such as appears in Figure 1 of the ‘992 patent, and that the “controllable image generator” of that claim was a controllable video *recording* device, as exemplified by camera 109 in the creation system of Figure 1.

## 1. Claim Construction Briefing

In its opening claim construction brief, Patent Harbor responded to Defendants-Appellees' earlier proposal in the case that "controllable image generator"—a phrase not used in the written description of the '992 patent—be construed as "a controllable camera." Patent Harbor argued that this proposed construction was an improper attempt to recast claim 2 from a video *playback* device to a video *creation* device. (A2735). Although contending initially that "controllable image generator" didn't require construction and could comprise either a playback or recording device per its plain meaning, (A2734), Patent Harbor countered Defendants-Appellees' proposed construction by noting that "[c]laim 2 of the '992 Patent is not directed to recording video, but instead is directed to an apparatus that can display pre-recorded video that is associated with positions in a content image display (i.e., a scene selection screen)." (A2730). In other words, Patent Harbor argued that the claimed context of "controllable image generator" in claim 2 limited an otherwise potentially-broad interpretation to a controllable video playback device only.

In response, Defendants-Appellees pointed to the word "controllable" in the disputed term, arguing that "the *only* feature of the patent that supports [the controllable image generator] limitation is the 'controllable camera,' which is

described in connection with the embodiment of Fig. 1.” (A2781) (emphasis in original).

Defendants-Appellees further suggested that their proposed construction of “controllable image generator” was “consistent with its use in claims 3 and 4 of the parent ‘514 patent.” (A2782). In fact, claim 3 does not recite a “controllable image generator,” but instead recites a “controllable *video* image generator.” Nonetheless, Defendants-Appellees noted in support of their argument that dependent claim 4 “indicated that the controllable image generator was a ‘robot mounted video camera.’” *Id.*

In reply, Patent Harbor argued that “[w]hen Claim 2 is properly construed in light of Figure 2, it is clear that no camera of any kind is called for by the claim elements.” (A3171). Patent Harbor explained that the “controllable image generator” of claim 2 of the ‘992 patent (claim 2/‘992)<sup>12</sup> and the “controllable video image generator” of claim 3 of the ‘514 patent (claim 3/‘514) could not be construed in the same manner in both patents, given the differences in their contexts:

it is important to note that, in the ‘514 Patent, Claim 3 recites that the controllable video image generator *produces frames of video data* and the video storage *stores frames of video data*. In contrast, Claim 2 of the ‘992 Patent recites that the controllable image generator *produces*

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<sup>12</sup> Patent Harbor will adopt this shorthand for simplicity.

*video images in response to indicated video image data.* Thus, in the context of Claim 2 of the ‘992 Patent, the controllable image generator produces video images from already-existing video image data, a role that is not consistent with that of Defendants’ proposed “controllable camera” construction.

(A3171-3172) (emphasis in original).

## **2. Claim Construction Hearing**

A *Markman* hearing was held on October 4, 2011 by Magistrate Judge Love.

In its presentation, Patent Harbor showed the clear linkage between the various limitations in claim 2/‘992 and the disclosed playback system of Figure 2. In particular, Patent Harbor identified the video disk player 202/203 as comprising the “controllable image generator.”<sup>13</sup> (A2864). The following exhibit is taken from Patent Harbor’s presentation:

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<sup>13</sup> Patent Harbor’s pre-hearing briefing contended that “computer 201” in the ‘992 patent was analogous to the “controllable image generator.” (A2734-2735). However, by the time of the *Markman* hearing, and in response to the Defendants-Appellees’ continued pressing of its obviously insupportable construction, Patent Harbor clarified that it was more succinctly the players 202/203 that were analogous to the “controllable image generator” in claim 2/‘992.

## '992 Patent, Claim 2

2. An apparatus for generating content addressable video, comprising:

[a.] a content image display which displays a content video image representative of an organization of content addressable video, the content video image having positions within the content video image corresponding to desired content of video images to be displayed;

[b.] a controller, in communication with the content image display, which generates control signals indicating content for video images in response to respective positions within the content video image; and

[c.] controllable image generator, responsive to the control signals, which produces video images in response to video image data indicated by the control signals corresponding to respective positions in the content video image.

<sup>15</sup> FIG. 2 illustrates the preferred system for displaying the content addressable video according to the present invention.

- '992 Patent, Col. 4, Lines 15-17

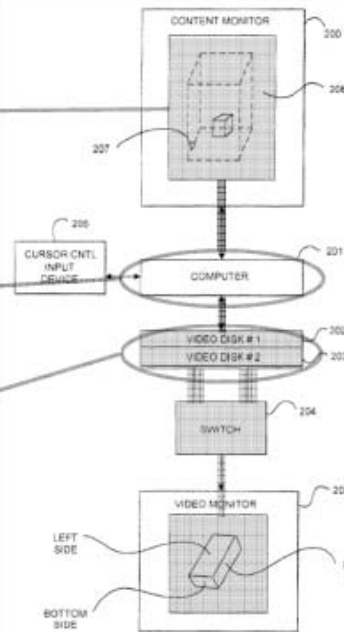


Figure 2

(A2863) (annotations removed).

Other Exhibits parsed the claim language connected to “controllable image generator” to show its relevance to the playback system of Figure 2, and to the video disk players 202/203 in particular. For example, Patent Harbor showed that the players 202/203:

- were “responsive to the control signals” generated by the “controller” (computer 201),<sup>14</sup> as shown by the arrow connecting the computer 201 to the players 202/203 (A2865);<sup>15</sup>

<sup>14</sup> The computer 201 corresponds to the “controller” limitation in claim 2/'992, as it provides the control signals for the “controllable image generator,” which control signals are issued “in response to respective positions within the video content image” as required by the controller limitation. *See* A2863; A2874.

- “produce[] video images [the image on video monitor 205] in response to video image data [stored on the disks in players 202/203] indicated by the control signals” (A2877); and
- that such “video images” “correspond[] to respective positions [the position of cursor 207] in the content video image [208]” (A2869).

See A2863-2877.

Patent Harbor also noted an important inconsistency with Defendants-Appellees’ position that a camera could operate as a “controllable image generator” relating to the claimed requirement that this device “produces video images in response to video image *data*.” Patent Harbor noted that the disclosed camera 109 in Figure 1 could not produce video images “in response to video image *data*,” because *data* is that which is *already recorded, not the subject that is being filmed*.

Specifically, Patent Harbor noted that:

[t]o be video image data, it is already data that has been collected, recorded, and stored in the, quote, data space, as [the ‘902 patent]<sup>16</sup> would call it, on the video disk players. And so to produce the video image at that point in time, that video is already there. It’s tagged. It’s ready.

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<sup>15</sup> This showing was bolstered by disclosure in the ‘902 patent, which as noted earlier was cross-referenced in the ‘992 patent as relevant to implementation of the display system of Figure 2. See ‘902 patent, col. 5, ll. 40-58 (A170) (noting that the video disk players are responsive to “control signals” to content-address “frames of video data” for display).

<sup>16</sup> See note 11, *supra*.

(A2812, 96:24-97:5). Patent Harbor also noted that video image data is referenced in the ‘992 patent with respect to data “frames,” which clearly only has relevance to pre-recorded data.<sup>17</sup> (A2867).

In response to questioning from the Magistrate regarding the implication of “video image data” to the construction of “controllable image generator,” Defendants-Appellees acknowledged this phrase’s “significant effect on the claim,” but instead proffered that the “video image data” “is not the video itself. It’s the tags.” (A2818-2819, 121:14-122:24). This is clearly incorrect, as the ‘992 patent never equates “video image data” to the keys or tags used to link the stored video image data to the content video image.

### **3. The Magistrate’s Claim Construction Order**

The Magistrate issued a Memorandum Opinion and Order construing “controllable image generator” as a “controllable video recording device.” (A22).

The Court was not persuaded that the playback system of Figure 2 was representative of claim 2/‘992 patent, and instead determined that the creation system of Figure 1 was a better match. (A18-19).

The Court noted, paralleling the language of “controllable image generator,” that Figure 1 was described as a system for “*generating*” content addressable video,

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<sup>17</sup> See Section (G)(2), *infra*.

and that the disclosed camera was “*controlled* to *generate* a plurality of frames of video information.” (A19, citing ‘992 patent, col. 3, ll. 11-14 and 34-36) (emphasis in original). The Court also noted that the ‘992 patent specification’s use of “controllable” and “control signals” was consistent with the ‘992 patent’s description of the camera, because those words and variants thereof were, in the Magistrate’s opinion, only used in the context of a recording device such as a camera. (A21).

The Magistrate did not assess the written description of the ‘992 patent to determine whether the players 202/203 in the playback system of Figure 2 were controllable in the manner claimed, despite Patent Harbor’s reliance on those devices as corresponding to the “controllable image generator” in the *Markman* hearing.<sup>18</sup> Nor did the Magistrate expressly consider the claimed context of “controllable image generator” in claim 2/‘992.

The Court also drew support from similarities in the claim language used in claim 2/‘992 and claim 3/‘514,<sup>19</sup> the latter of which was acknowledged by both

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<sup>18</sup> The magistrate did assess the controllability of the “computer 201” in the playback system of Figure 2, (A18-19), even though Patent Harbor had clarified at the *Markman* hearing that the players 202/203 were analogous to the “controllable image generator.” See note 13, *supra*.

<sup>19</sup> See A19 (noting that “[t]he first two claim elements which Plaintiff relies on in support of its display argument are found verbatim in claim 3 of the ‘514 patent.”).



parties as a “recording claim.” (A19). The Court noted that claim 3/’514 recited a similarly-phrased limitation—“controllable video image generator”—which its dependent claim 4 clarified could comprise a “robot mounted video camera.” (A21). The Court thus concluded that “controllable image generator” in claim 2/’992 “must” be similarly construed to “be consistent with the internal record.” (A22).

The Court also considered Patent Harbor’s argument to “force an erroneous interpretation of ‘video image data.’” (A20). The Court, again without any consideration to the context of this phrase in claim 2, opined that interpreting “video image data” as “prerecorded video” as proffered by Patent Harbor would be “inconsistent with the specification and the way that claims are drafted across the patent family.”<sup>20</sup> *Id.* The Court noted that the specification of the ’992 patent doesn’t contain the term “video image data,” and that other claims in the ’514 patent recite “frames of video data” when referring to stored video, *id.*, apparently in support of the conclusion that the claimed “video image data” could not correspond to disclosed frames.

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<sup>20</sup> Despite referencing the “patent family,” the claims of the parent ’514 patent do not recite “video image data.”

#### **4. Patent Harbor's Objections to the Claim Construction Order**

Pursuant to Fed. R. Civ. P. 72, Patent Harbor filed objections to the Magistrate's Memorandum Opinion and Order concerning the construction of "controllable image generator" as a "controllable video recording device" on November 10, 2011. (A3057-3059).

Patent Harbor contended that the Court had erred in construing "controllable image generator" in claim 2/'992 with reference to claim 3/'514. As well as noting that claim 3/'514 actually recited different language ("controllable *video* image generator"), Patent Harbor noted that "the relationships between the 'image generators' and the 'data'" were recited differently in these claims: although both claims use "data" consistently with information that is stored or being stored, claim 2/'992 "*produces video images in response to video image data,*" while claim 3/'514 "*produces frames of video data that get stored in storage locations.*" (A3067) (emphasis in original). In other words, Patent Harbor explained that the claimed context of "controllable image generator" of claim 2/'992 comprised a controllable video playback device, i.e., a device that displays or plays back stored video, while the claimed context of "controllable video image generator" of claim 3/'514 comprised a controllable video recording device, i.e., a device that captures video and stores it as video image data. (A3067-3068).

Patent Harbor bolstered its argument that “controllable image generator” in claim 2/’992 should be construed as a controllable video playback device by noting that the “controllable image generator” of claim 2/’992 produces video images “in response to video image *data*,” i.e., video data (bits of information) that is stored or being stored. (A3061).<sup>21</sup>

Patent Harbor observed that the Court’s interpretation of “controllable image generator” as a “controllable video recording device” necessarily means that “video image data” in claim 2/’992 is “what is being recorded,” i.e., the subject being filmed by the camera. (A3063). Patent Harbor noted that such an interpretation was unsupportable, because “[t]he ’992 patent never used data to refer to a subject being recorded.” (A3064) (emphasis in original). Because data is not the subject being filmed, Patent Harbor reasoned that the Court’s construction of “controllable image generator” could not be correct without reading the concept of video image “data” out of the claim. (A3063).

Patent Harbor also argued that the Court erred in its conclusion that “video image data” did not refer to video data stored or being stored solely because the

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<sup>21</sup> While Patent Harbor pointed out to the District Court that there appeared to be new disputes about the meaning of “video image data,” and suggested that the Court should construe this formerly-uncontested claim term, Patent Harbor does not assert the failure of the Court to expressly construe “video image data” as error in this appeal.

written description of the ‘992 patent refers to stored video as “frames of video data” instead of as “video image data.” Patent Harbor noted that “video image data” and “frames of video data” were *synonymous* as used in the ‘992 patent, not *different*, and that use of the term “data” consistently in both phrases confirms this.<sup>22</sup> In other words, Patent Harbor argued that the qualifier describing the data, whether as “frames of video” *data* or as “video image” *data*, did not affect the character of data, and that regardless of the qualifier, such data clearly represented the same digital video information that is stored.

Patent Harbor also pointed out that claim 1 of the ‘992 patent—a claim indisputably dealing with recording—recited “generating video data . . . defining one or more video images.” (A3065). That claim, Patent Harbor argued, showed the proper distinction between video *data* and video *images* in the context of recording: video images are the subjects captured on film (e.g., by a camera), while video image data is the stored representation of those images.<sup>23</sup> Nonetheless, the

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<sup>22</sup> See A3064 (“No matter whether the phrase [in the ‘992 patent] begins with ‘frames of video’ or just ‘video’ or ‘video image,’ it always ends with ‘data’ when referring to video that is stored or being stored. Therefore, the ‘992 Patent consistently uses the term data as it is commonly known, bits of information that [are] stored or being stored”).

<sup>23</sup> See A3065 (noting with respect to claim 1 that “[i]t is clear that video data is the recorded video of the actual images (content) the recording device received.”).

Court's construction implicitly found that video images were the same as video image data.

Defendants-Appellees did not respond to Patent Harbor's objections regarding the "controllable image generator" limitation.

### **5. The District Court's Adoption of the Claim Construction Order**

On March 16, 2012, District Court Judge Davis adopted the Magistrate's opinion and hence affirmed the construction of "controllable image generator" as a "controllable video recording device," with little comment. (A33-34).<sup>24</sup>

### **6. The Parties' Joint Stipulation of Non-Infringement Based on the Claim Construction Order**

On the basis of the Court's construction of "controllable image generator," Patent Harbor and Defendants-Appellees agreed that the accused video disk players could not infringe. The parties thus stipulated to a judgment of non-infringement of claim 2 of the '992 patent, which was entered by the Court. (A3159-3161). The stipulation provides that "if the Court's determination on claim construction [of the 'controllable image generator' limitation] is reversed or modified on appeal such

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<sup>24</sup> The District Court did note that the Magistrate had rejected Patent Harbor's arguments regarding how the language "video image data" in the "controllable image generator" limitation affected this limitation's construction. (A34).

that the matter is remanded for further consideration, Plaintiff and the . . .  
Defendants reserve all of their claims, arguments and defenses.” (A3160).

## SUMMARY OF THE ARGUMENT

“Controllable image generator” as set forth in claim 2 of the ‘992 patent is properly construed as a “controllable video *playback* device.” It was error for the District Court to construe it as a “controllable video *recording* device.”

The claimed context of “controllable image generator” in claim 2/‘992 is important and was overlooked by the Court. The “controllable image generator,” as required by the claim language, is a device that produces video images in response to video image data—something that the video disk players disclosed in the ‘992 patent do, but which the disclosed cameras do not. Not surprisingly therefore, the disclosed players correspond to the “controllable image generator” limitation, while the disclosed camera does not, as will be shown. The players are controllable exactly as claimed—a point not considered in the District Court’s analysis.

The District Court’s claim construction analysis was erroneous in other respects. The District Court improperly concluded that because the “controllable video image generator” in claim 3 of the parent ‘514 patent comprised a recording device, the “controllable image generator” of claim 2/‘992 “must” be similarly construed to preserve consistency within the patent family. The Court overlooked however that this presumption of consistency can be trumped by context. The claimed contexts of these limitations in claim 3/‘514 and claim 2/‘992 are

significantly different; for one, the inputs and outputs of these claimed devices are different. These differences show that while the “controllable video image generator” of claim 3/’514 comprises a controllable video *recording* device, the “controllable image generator” of claim 2/’992 comprises a controllable video *playback* device.

The Court further erred in its consideration of “video image data,” which as noted above is what the “controllable image generator” uses to produce video images. Despite Patent Harbor’s evidence showing that such “video image data” corresponded to the “frames of video data” disclosed in the ‘992 patent, the Court erred in finding that correlation inconsistent merely because of the different language used in describing this “data.” Patent Harbor will show that this *data* as disclosed in the ‘992 patent, regardless of how it is linguistically qualified, is consistently that which the camera has captured and stored and which can be later used by the players to produce video images. In other words, “video image data” in claim 2/’992 is synonymous with, not different from, the “frames of video data” disclosed in the ‘992 patent. As a result, the “controllable image generator” can correspond only to a playback device, not a recording device, because a recording device does not respond to video image *data* to produce video images.



## ARGUMENT

The sole issue in this appeal is the construction of “controllable image generator” as used in claim 2 of the ‘992 patent. Claim construction is a purely legal issue which this Court reviews *de novo* and without deference to the District Court. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448 (Fed. Cir. 1998) (en banc).<sup>25</sup>

### E. Introduction

There is no dispute that the words “controllable image generator” per their plain and ordinary meaning could generally (absent further analysis of the written description and the claim language) encompass either a “controllable video playback device” such as a video disk player as Patent Harbor contends, or a “controllable video recording device” such as a camera as Defendants-Appellees contend, and as the District Court found. *See* (A2814, 102:7-105:18; A2815, 109:4-19) (*Markman* hearing transcript, discussing this issue).

“Controllable image generator” is however not used in the written description of the ‘992 patent to refer to either the players 202/203 in the playback system of Figure 2, or the camera 109 in the creation system of Figure 1; in fact, it is not used

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<sup>25</sup> *But see Lighting Ballast Control, LLC v. Philips Electronics N.A. Corp.*, 500 Fed. Appx. 951, 2013 WL 1035092 (Fed. Cir. Mar. 15, 2013) (en banc) (granting *en banc* review of the *Cybor* claim construction review standard, particularly as relates to District Court deference).

in the written description at all. As such, the written description of the ‘992 patent is not immediately helpful in identifying what disclosed structures correspond to the words “controllable image generator” of claim 2/‘992. However, the language of claim 2/‘992 provides context, matched by the ‘992 patent’s written description, that clearly shows the “controllable image generator” to be a controllable video playback device.

**F. The Claimed Context of the “Controllable Image Generator” Limitation in Claim 2/‘992 Mandates a Construction of a “Controllable Video *Playback* Device,” not a “Controllable Video *Recording* Device”**

The term “controllable image generator” must be construed in the *context* of how it is used in claim 2/‘992 and with respect to any relevant written description, not in a vacuum or on the basis of similar terms used in a related patent claim. *Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1295 (Fed. Cir. 2003) (holding that a disputed claim limitation must be construed in the context of other words and limitations in the claim and in light of the written description).

Such context is expressly stated in claim 2/‘992. For convenience, the “controllable image generator” limitation is reproduced here with key phrases in bold:

***Controllable image generator*** responsive to the control signals, which produces ***video images*** in response to ***video image data*** indicated by the control signals corresponding to respective positions in the content video image.

Per its language, the “controllable image generator” in claim 2/’992 produces video images “in response to video image *data*.” Stated simply, “*video image data*” is *input* to the “controllable image generator,” while “*video images*” are *output*. A recording device such as a camera 109 cannot and does not operate in this manner in the creation system of Figure 1 of the ‘992 patent. This is instead the manner in which the disclosed video disk players 202/203 operate in the playback system of Figure 2.

**1. The Camera Disclosed in the ‘992 Patent Does Not Respond to “Video Image Data” or “Produce Video Images”**

Video image *data* is not input into a recording device such as a camera, nor does a camera respond to video image data to produce video images. Even without parsing the ‘992 patent, it is clear that what is input to a camera are video images of the subject being filmed; *data* is never the subject being filmed.

Video image “data,” by contrast, i.e., bits of computerized information, is what the camera *produces* in response to the video images it is filming, and which is ultimately stored on the video disks for later access by the video disk players. Thus, unlike a player which receives video image data as an input, *a camera produces video image data as an output*. The ‘992 patent unambiguously describes this process:

Positions in the content video image are then translated by a control circuit into camera positioning signals. *A controllable camera*, such as a robot mounted camera, *then generates the frames of video* in response to the position control signals derived from the content video image. A processing unit then associates *each frame of video data generated by the controllable camera*, with positions in the content video image.

Col. 2, ll. 34-41 (A155) (emphasis added).

Even though “video image data” is not a phrase used in the written description of the ‘992 patent, the written description bears out the distinction that a camera produces video image *data* in response to the video *images* it is filming. Such filmed video images once captured by the camera and stored are referred to in the ‘992 patent as “frames of video,”<sup>26</sup> or “frames of video data,”<sup>27</sup> which are synonymous with “video image data.”<sup>28</sup> In other words, a recording device such as a camera captures or *receives video images* of a subject being filmed and *generates*

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<sup>26</sup> See, e.g., col. 2, ll. 35-37 (A155) (“*A controllable camera*, such as a robot mounted camera, then *generates the frames of video* in response to the position control signals . . . .”) (emphasis added).

<sup>27</sup> See, e.g., col. 2, l. 16 (A155) (noting that “frames of video data” can “comprise film of a geographic area” for example).

<sup>28</sup> Section (G)(2) of this Brief will show that the “video image data” in claim 2/‘992 and “frames of video data” in the written description of the ‘992 patent are synonymous.

*video image data* in response, which is then stored in addressable storage locations.<sup>29</sup>

Other claims in the ‘992 and ‘514 patents confirm this image/data distinction in the context of recording. Claim 1/‘992, which indisputably is directed to recording, recites “generating *video data* . . . defining one or more *video images*.” (A3065). Likewise, the “controllable video image generator” of claim 3/‘514, which neither party disputes comprises a recording device, “*produces f[r]ames of video data, each frame determining a video image.*” (A147) (emphasis added).

Thus, both the written description of the ‘992 patent and claims directed to recording show the proper distinction between video image *data* and video *images* in the context of recording: video *images* are the subjects captured by the camera, while video image *data* is the stored representation of those video images in “frames” of data.

By contrast, the written description of the ‘992 patent *never* describes the camera or any other recording device as being “responsive” to, or as receiving as an

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<sup>29</sup> See, e.g., col. 2, ll. 1-4 (A155) (describing content addressable video creation as “storing a plurality of *frames of video data* at addressable storage locations. Each *frame of video data* is stored with a tag which indicates the contents of the *video image defined by the associated frame.*”) (emphasis added).

input, video image “data” as the claim requires of the “controllable image generator”; in fact, it never uses *data* to refer to a subject being recorded by a camera at all.

It is therefore erroneous that the District Court construed “controllable image generator” as comprising a “controllable video recording device” such as a camera. This construction is inconsistent with the written description of the ‘992 patent and with the manner in which the “controllable image generator” is contextually claimed because a camera does not produce video images in response to video image data as claim 2/‘992 requires. It is quite simply an unsustainable “nonsensical reading” of claim 2. *Microprocessor Enhancement Corp. v. Texas Instruments, Inc.*, 520 F.3d 1367, 1375 (Fed. Cir. 2008) (discussed further below). Cameras do not film data; they generate data after filming video images of a subject.

Alternatively, the District Court’s construction effectively and erroneously reads “data” out of the claim, which is improper: claims must be “interpreted with an eye toward giving effect to all terms in the claim.” *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006).

## 2. The Players Disclosed in the ‘992 Patent Do Respond to “Video Image Data” and “Produce Video Images”

On the other hand, the disclosed players 202/203 in the playback system of Figure 2 are described *precisely* as the “controllable image generator” limitation requires. The Background of this Brief, *see* Section (D)(2), *supra*, discussed Patent Harbor’s presentation at the *Markman* hearing, where it was shown how the video disk players 202/203 are controlled to produce video images—i.e., to show how the players 202/203 per the claim language of claim 2/‘992:

- are “responsive to the control signals” generated by the “controller” (computer 201) (A2865);
- “produce[] video images [the image on video monitor 205] in response to video image data [stored on the disks in players 202/203] indicated by the control signals”<sup>30</sup> (A2877); and
- that such “video images” “correspond[] to respective positions [the position of cursor 207] in the content video image [208]” (A2869).

*See* A2863-2877.

Further to this, the ‘992 patent expressly describes control of the players 202/203 as follows:

In [Figure 2], a content monitor 200 is provided which is connected to the computer 201. Two video disk players 202 and 203 store a plurality of video frames. A video switcher 204 which is controlled by computer 201 selects output video from the video disks in the players

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<sup>30</sup> Note that, as claimed, the control signal from the controller indicates *video image data* (i.e., stored video), not *a video image to be recorded*, as is the case with a controllable camera.

202 and 203. The output video [is] supplied to video monitor 205. A cursor control input device 206, like a mouse or track ball in the preferred system, is coupled to the computer 201. A user interactively positions the cursor 207 within the content video image 208 on the content monitor 200. A perspective of the object is displayed on the video monitor 205 which is indicated by the position of the cursor 207 in the content image 208.

Col. 4, ll. 17-29 (A156). In other words, the computer 201<sup>31</sup> controls the players 202/203 through, in part, control of the switcher 204, in accordance with a position in the content video image 208 (the “control signal”), to produce position-corresponding video images (on monitor 205) from the video image data stored on a disk. And unlike the camera discussed earlier, the players 202/203 clearly respond to video image data as input from the disks to produce video images for display.

As such, the written description of the camera recording devices cannot support the “controllable image generator” limitation of claim 2/’992, but the disclosed players 202/203 clearly do. This justifies construction of this limitation as a “controllable video playback device,” and shows the District Court’s construction—“controllable video playback devices”—to be erroneous.

#### **G. The District Court’s Justifications for its Construction are Erroneous**

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<sup>31</sup> As noted previously, the computer 201 corresponds to the “controller” limitation in claim 2/’992. See note 14, *supra*.



The District Court, rather than consider the claimed context of “controllable image generator” in claim 2/‘992 and in relation to the written description, analyzed that claim in ways that resulted in error. Each will be addressed separately here.

**1. The “Controllable Image Generator” of Claim 2/‘992 is Not Amenable to the Same Construction as the “Controllable Video Image Generator” of Claim 3/‘514**

As described earlier, the Court noted that claim 3/‘514 recited a similarly-phrased limitation—“controllable video image generator”—which its dependent claim 4/‘514 patent clarified could comprise a “robot mounted video camera.” (A21). The Court thus concluded that “controllable image generator” in claim 2/‘992 “*must*” be similarly construed to “be consistent with the internal record.” (A22) (emphasis added). In other words, the Court concluded that because “controllable video image generator” in claim 3/‘514 comprises a recording device, so too *must* the “controllable image generator” in claim 2/‘992 comprise a recording device.

But simply equating these terms in this manner was erroneous. A proper claim construction analysis must consider these limitations in their claimed contexts, which the Court ignored. A proper contextual analysis shows that while the “controllable video image generator” of claim 3/‘514 comprises “a controllable video recording device,” the “controllable image generator” of claim 2/‘992 comprises a “controllable video playback device.”

**a. Similar Claim Terms Are Not Necessarily Construed Similarly Within a Patent Family; Claimed Context Must Be Considered**

Even if one assumes that the phrases “controllable image generator” in claim 2/‘992 and “controllable video image generator” in claim 3/‘514 are alike,<sup>32</sup> and even though it is presumed that like claim limitations should be construed consistently across a patent family,<sup>33</sup> that does not dictate the same or similar construction: it depends on the *claimed context of the limitation*. *Microprocessor Enhancement Corp. v. Texas Instruments, Inc.*, 520 F.3d 1367, 1375 (Fed. Cir. 2008) (holding that, while there is a presumption that a claim term will be construed consistently when used throughout the claims, there is no requirement that a claim term be construed uniformly, particularly if it would lead to a “nonsensical reading”).

In other words, “[a] word or phrase *used consistently* throughout a claim [or patent family] should be *interpreted consistently*.” *Id.* (quoting *Epcon Gas Sys.*,

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<sup>32</sup> Patent Harbor assumes for purposes of this appeal no particular significance to the addition of “video” to the “controllable *video* image generator” limitation claim 3/‘514.

<sup>33</sup> *See Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1334 (Fed. Cir. 2003) (“[W]e presume, unless otherwise compelled, that the same claim term in the same patent or related patents carries the same construed meaning.”) (citing *Fin Control Sys. Pty, Ltd. v. OAM, Inc.*, 265 F.3d 1311, 1318 (Fed. Cir. 2001)).

*Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022, 1030-31 (Fed. Cir. 2002) (emphasis in original)). However, if the claimed context shows inconsistent use of a term, differing constructions of that term may be warranted, particularly if a uniform construction would lead to a “nonsensical reading” of the claims. *Id.* If a term is “not surrounded by uniform language that requires a single interpretation of the term,” *id.* at 1376, different constructions for the term can result. *See, e.g., Epcon Gas Sys.*, 279 F.3d at 1031 (construing “substantially” as having two different meanings based on its use in “two contexts with a subtle but significant difference”).

It was error for the District Court to hold, without further analysis of the context of the claims, that the “controllable image generator” of claim 2/‘992 *must* mean the same as the similarly-phrased “controllable video image generator” of claim 3/‘514. Such contextual differences are significant, and require different constructions, as discussed next.

**b. The Claimed Context of the Terms in Claim 3/‘514 and Claim 2/‘992 Dictate Different Constructions**

It is quite clear that “controllable image generator” in claim 2/‘992 and “controllable video image generator” in claim 3/‘514 are contextually different. Specifically, *they are different in the claimed inputs they receive and the claimed outputs they produce.*

In claim 2/’992, and as already discussed above, already-present “video image data” is used by the “controllable image generator” to “produce[] video images”—exactly how the video disk players 202/203 in the playback system of Figure 2 operate, as explained earlier. *See* Section (F)(2), *supra*. In short, in claim 2/’992, “*video image data*” is *input* to the “controllable image generator,” and “*video images*” are *output*.

The inputs to and outputs from the “controllable video image generator” are different in claim 3/’514. In claim 3/’514, the video image data is not *input* to the “controllable video image generator.” Such *video image data is instead output* from the “controllable video image generator,” which “produces f[r]ames of video data,”<sup>34</sup> as explained earlier. *See* Section (F)(1), *supra*. No party disputes that claim 3/’514 is a content-addressable-video creation claim, or that the “controllable video image generator” in claim 3/’514 comprises a recording device such as a camera. Therefore, it is not surprising that claim 3/’514 recites further that each frame output by the “controllable video image generator” “*determine[s] a video image* having the content indicated by the control signals corresponding to the respective position in the content video image,” because the camera is capturing

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<sup>34</sup> Section (G)(2) of this Brief will show that the “video image data” in claim 2/’992 and “frames of video data” in the written description of the ’992 patent are synonymous.

live video images as controlled by the content video image—exactly how the camera 109 in the creation system of Figure 1 operates. In other words, “*video images*” *are input* to the “controllable video image generator” in claim 3/‘514, not *output* as occurred in claim 2/‘992.

The significant contextual difference between the “controllable image generator” in claim 2/‘992 and “controllable video image generator” in claim 3/‘514 warrant different constructions. Although no one disputes that “controllable video image generator” in claim 3/‘514 comprises a “controllable video recording device,” the different context of the “controllable image generator” in claim 2/‘992 necessitates a construction of a “controllable video playback device.”

## 2. “Video Image Data” is Synonymous With Other Descriptions of Data in the ‘992 Patent

As noted earlier, the District Court didn’t positively construe “video image *data*” in its consideration of the construction of “controllable image generator.” But the District Court did opine that Patent Harbor’s interpretation that “video image data” comprises prerecorded (stored) video data forced “an erroneous interpretation of ‘video image data’” that would be “inconsistent with the specification and the way that claims are drafted across the patent family.” (A20). The sole reasoning for this conclusion was that the specification and other claims in the patent family

don't contain the term "video image data," but instead recite "frames of video data" when referring to stored video. *Id.*

This too was erroneous, and an overly-literal analysis. It assumes that "video image data" in claim 2/'992 and "frames of video data" as disclosed in the '992 patent and as recited in other claims in the patent family must refer to different things merely because they are worded differently.

A specification can disclose support ("frames of video data") for a particular claim limitation ("video image data") that doesn't match that limitation verbatim. *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570 (Fed. Cir. 1996) (holding that a claim limitation can be supported by different language used in the specification). And two different claims can recite the same subject matter (in this case, the same "data") using different claim language ("video image data" in claim 2/'992 and "f[r]ames of video data" in claim 3/'514 for example), so long as the context makes clear that they are amenable to the same construction. *See Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1330 (Fed. Cir. 2009) ("When different words or phrases are used in separate claims, a difference in meaning is presumed. However, simply noting the difference in the use of claim language does not end the matter. Different terms or phrases in separate claims may be construed to cover the same subject matter where the written description and prosecution history indicate that

such a reading of the terms or phrases is proper.”) (quoting *Nystrom v. TREX Co.*, 424 F.3d 1136, 1143 (Fed. Cir. 2005)).

Context here clearly equates “video image data” with “frames of video data.” Wherever “data” appears in the specification relevant to this issue, or in other claims in the family for that matter, it always refers to “data” of a stored pre-recorded video image. Several examples showing this have already been noted above. To consider just one example, when describing the recording of content addressable video, the ‘992 patent refers to “storing a plurality of *frames of video data* at addressable storage locations. Each *frame of video data* is stored with a tag which indicates the contents of the *video image defined by the associated frame.*”). Col. 2, ll. 1-4 (A155) (emphasis added). Stated differently, “*frames of video data*” “*define*” a “*video image,*” and thus comprise “*video image data.*”

Moreover, “frames of video data” are sometimes referred to merely as “video data,” and so “frames” is not used to differentiate from the stored data of the video images. For example, claim 1/‘992, which as noted above is a claim directed to recording, recites “generating *video data* in response to the control signals, the *video data defining one or more video images* having the content indicated by the control signals.” Again, this makes clear that “frames of video data” are “video data,” which in turn define “video images,” and thus comprise “video image data.”

Nothing in the specification of the ‘992 patent or in other claims in the family upsets this correlation between “video image data,” “frames of video data,” or just plain “video data.” In other words, rather than being *different*, the ‘992 patent treats “video image data” in claim 2/’992 *synonymously* with these other data recitations. They are simply different words used to refer to the same “*data*”—that which the camera produces for storage (in claim 3/’514 for example), and that which the players later access to produce video images (in claim 2/’992). Assuming that “video image data” and “frames of video data” were different merely because they are worded differently was erroneous, and comprised a too-simplistic shortcut that failed to appreciate the similar use of these terms in context.

### **3. The Requirement of “Control”**

Finally, in deciding that “controllable image generator” comprises a “controllable video recording device” such as a camera, the District Court’s reasoning rested in part on its assessment that “[t]he specification consistently uses ‘controllable’ or a variant in the context of a recording device” such as camera 109. (A21).

This analysis of the written description of the ‘992 patent by the District Court was incomplete, and erroneous in that it did not also consider whether the



players 202/203 in the playback system of Figure 1 were also controllable in the manner claimed.<sup>35</sup>

In any event, the players 202/203 clearly are controllable. Sections (B)(2) and (D)(2) of this Brief discussed this and other issues, and are not repeated in full here. Nonetheless, Patent Harbor reminds the Court of the following disclosure from the ‘992 patent:

“In [Figure 2], a content monitor 200 is provided which is connected to the computer 201. *Two video disk players 202 and 203 store a plurality of video frames. A video switcher 204 which is controlled by computer 201 selects output video from the video disks in the players 202 and 203.* The output video [is] supplied to video monitor 205. . . .”

Col. 4, ll. 17-22 (A156).

The players 202/203 as disclosed are clearly controlled by the computer 201.<sup>36</sup> That the camera 109 is disclosed as being controllable does not mean that the players 202/203 or other aspects of the disclosed systems are not, which is not surprising given the disclosed systems’ complexities.

## H. Summary

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<sup>35</sup> As discussed earlier, the District Court reviewed the written description of the ‘992 patent to assess the controllability of computer 201, but not the players 202/203. *See* note 18, *supra*.

<sup>36</sup> As noted previously, the computer 201 corresponds to the “controller” limitation in claim 2/‘992. *See* note 14, *supra*.

The context of claim 2/'992 and its corresponding written description mandate that the “controllable image generator” must be construed as a “controllable video playback device.” The Court’s analysis was incomplete and erroneous.

At its base, the District Court’s construction of “controllable image generator” rested on which devices disclosed in the '992 patent—recording devices such as cameras, or playback devices such as the video disk players—best supported this limitation. Patent Harbor submits that this was a proper manner to determine the construction, but that the Court misinterpreted both the written description and the claimed context of the “controllable image generator” limitation in determining that the proper construction was a “controllable video recording device.” The proper analysis provided by Patent Harbor, and reiterated here, shows that this construction cannot be correct, and instead that a construction of a “controllable video playback device” is warranted.

## CONCLUSION

The District Court erred in construing “controllable image generator” as used in claim 2/’992 as a “controllable video *recording* device.” The proper construction is “a controllable video *playback* device,” and this Court should so hold. Patent Harbor respectfully requests this Court to vacate the District Court’s construction and to remand this case to the District Court for further proceedings consistent with the correct construction.

Respectfully submitted,

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Date: 6/21/2013

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
TYLER DIVISION**

**PATENT HARBOR, LLC**

**Plaintiff,**

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§

**v.**

**AUDIOVOX CORP., et al.,**

**Defendants.**

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§  
§  
§

**CIVIL ACTION NO.**

**6:10-cv-00361 LED-JDL**

**JURY TRIAL DEMANDED**

**v.**

**LG ELECTRONICS, INC., et al.,**

**Defendants.**

§  
§  
§  
§  
§

**CIVIL ACTION NO.**

**6:10-cv-00436 LED-JDL**

**JURY TRIAL DEMANDED**

**v.**

**TWENTIETH CENTURY FOX  
HOME ENTERTAINMENT LLC, et  
al.,**

**Defendants.**

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**CIVIL ACTION NO.**

**6:10-cv-00607 LED-JDL**

**JURY TRIAL DEMANDED**

**MEMORANDUM OPINION AND ORDER**

This claim construction opinion construes the disputed claim terms in U.S. Patent No. 5,684,515, entitled “Apparatus and Method for Assembling Content Addressable Video” (“the ‘514 patent”) and its continuation, U.S. Patent No. 5,977,992 (“the ‘992 patent”) sharing the same name. The parties have presented their claim construction positions (Doc. Nos. 316, 327, and 330).<sup>1</sup> On

<sup>1</sup>The parties submitted joint claim construction briefing across the three cases. For simplicity’s sake, the Court will refer to the docket numbers in the *Twentieth Century Fox Home Entertainment LLC* action.

October 4, 2011, the Court held a joint claim construction hearing. For the reasons stated herein, the Court adopts the constructions set forth below.

## OVERVIEW OF THE PATENTS

The patents in suit are directed towards methods and apparatuses for assembling and generating “content addressable video.” *See* ‘514 patent at 1:23-28.<sup>2</sup> The ‘514 patent describes an improvement to an interactive video system capable of displaying content based on video as described in U.S. Patent No. 4,857,902, entitled “Position-Dependant Interactivity System for Image Display” (“the Naimark Patent”) and referenced by the ‘514 patent. *Id.* at 4:27-29 (“Background concerning how to implement these interactive display systems can be found in the above cross referenced U.S. Pat. No. 4,857,902). The Naimark Patent discloses a system where, for example, a user may interact with a video of the Golden Gate Bridge by positioning a cursor on a virtual representation of the bridge and, in response, a video clip is accessed with the content indicated by the position of the cursor. *See* Naimark Patent at 4:48-5:4. For example, if a user positions the cursor on the northeast side of the bridge, the display device accesses video frames corresponding to video images taken from the northeast side of the bridge. *See id.* The system accomplishes this by storing the video frames with tags indicating the content of the video frames which can be accessed based on a user’s interaction with the virtual representation.

Practicing the Naimark Patent, however, required manually associating tags with frames of video which was a “time-consuming, tedious process.” ‘514 patent at 1:52-53. To solve this, the ‘514 and ‘992 patents disclose methods and apparatuses for automating the association of tags with

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<sup>2</sup>Plaintiff’s assert Claims 1 and 6 of the ‘514 patent and Claim 2 of the ‘992 patent. Because the patents share the same specification, the Court will only cite to the ‘514 patent unless discussing terms unique to the ‘992 patent.

video frames including at least three embodiments: associating the tags with prerecorded video frames, tagging frames of video as they are recorded, and displaying content based video based on their tags. Claim 1 of the '514 patent is representative of the assembly claims:

1. An apparatus for assembling content addressable video, comprising:
  - video storage which stores a plurality of frames of video data in storage locations having addresses, each frame defining a video image having a content for display;
  - tag storage which stores tags for associated frames of video data in the plurality, the tags indicating the contents of the video images defined by the associated frames;
  - processing resources, connected with the tag storage and the video storage, including resources that execute first program steps which assemble a content video image in response to the tags, the content video image including positions for corresponding flames of video data in the plurality; and
  - the processing resources including resources that execute second program steps which associate positions in the content video image with addresses of storage locations storing corresponding flames of video data.

'514 patent at 13:43-61 (Claim 1).

Claim 2 of the '992 patent is representative of the generating claims:

2. An apparatus for generating content addressable video, comprising:
  - a content image display which displays a content video image representative of an organization of content addressable video, the content video image having positions within the content video image corresponding to desired content of video images to be displayed;
  - a controller, in communication with the content image display, which generates control signals indicating content for video images in response to respective positions within the content video image; and
  - controllable image generator, responsive to the control signals, which produces video images in response to video image data indicated by the control signals corresponding to respective positions in the content video image.

'992 patent at 14:49:64 (Claim 2).

## CLAIM CONSTRUCTION PRINCIPLES

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). The Court examines a patent’s intrinsic evidence to define the patented invention’s scope. *Id.* at 1313-1314; *Bell Atl. Network Servs., Inc. v. Covad Commc’ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). Intrinsic evidence includes the claims, the rest of the specification, and the prosecution history. *Phillips*, 415 F.3d at 1312-13; *Bell Atl. Network Servs.*, 262 F.3d at 1267. The Court gives claim terms their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention. *Phillips*, 415 F.3d at 1312-13; *Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

Claim language guides the Court’s construction of claim terms. *Phillips*, 415 F.3d at 1314. “[T]he context in which a term is used in the asserted claim can be highly instructive.” *Id.* Other claims, asserted and unasserted, can provide additional instruction because “terms are normally used consistently throughout the patent.” *Id.* Differences among claims, such as additional limitations in dependent claims, can provide further guidance. *Id.*

“[C]laims ‘must be read in view of the specification, of which they are a part.’” *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995)). “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). In the specification, a patentee may define his own terms, give a claim term

a different meaning that it would otherwise possess, or disclaim or disavow some claim scope. *Phillips*, 415 F.3d at 1316. Although the Court generally presumes terms possess their ordinary meaning, this presumption can be overcome by statements of clear disclaimer. *See SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1343-44 (Fed. Cir. 2001). This presumption does not arise when the patentee acts as his own lexicographer. *See Irdeto Access, Inc. v. EchoStar Satellite Corp.*, 383 F.3d 1295, 1301 (Fed. Cir. 2004).

The specification may also resolve ambiguous claim terms “where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone.” *Teleflex, Inc.*, 299 F.3d at 1325. For example, “[a] claim interpretation that excludes a preferred embodiment from the scope of the claim ‘is rarely, if ever, correct.’” *Globetrotter Software, Inc. v. Elam Computer Group Inc.*, 362 F.3d 1367, 1381 (Fed. Cir. 2004) (quoting *Vitronics Corp.*, 90 F.3d at 1583). But, “[a]lthough the specification may aid the court in interpreting the meaning of disputed language in the claims, particular embodiments and examples appearing in the specification will not generally be read into the claims.” *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988); *see also Phillips*, 415 F.3d at 1323.

The prosecution history is another tool to supply the proper context for claim construction because a patentee may define a term during prosecution of the patent. *Home Diagnostics Inc. v. LifeScan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) (“As in the case of the specification, a patent applicant may define a term in prosecuting a patent”). The well established doctrine of prosecution disclaimer “preclud[es] patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution.” *Omega Eng’g Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir.



2003). The prosecution history must show that the patentee clearly and unambiguously disclaimed or disavowed the proposed interpretation during prosecution to obtain claim allowance. *Middleton Inc. v. 3M Co.*, 311 F.3d 1384, 1388 (Fed. Cir. 2002). “Indeed, by distinguishing the claimed invention over the prior art, an applicant is indicating what the claims do not cover.” *Spectrum Int’l v. Sterilite Corp.*, 164 F.3d 1372, 1378-79 (Fed. Cir. 1998) (quotation omitted). “As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public’s reliance on definitive statements made during prosecution.” *Omega Eng’g, Inc.*, 334 F.3d at 1324.

Although, “less significant than the intrinsic record in determining the legally operative meaning of claim language,” the Court may rely on extrinsic evidence to “shed useful light on the relevant art.” *Phillips*, 415 F.3d at 1317 (quotation omitted). Technical dictionaries and treatises may help the Court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but such sources may also provide overly broad definitions or may not be indicative of how terms are used in the patent. *Id.* at 1318. Similarly, expert testimony may aid the Court in determining the particular meaning of a term in the pertinent field, but “conclusory, unsupported assertions by experts as to the definition of a claim term are not useful.” *Id.* Generally, extrinsic evidence is “less reliable than the patent and its prosecution history in determining how to read claim terms.” *Id.*

## DISCUSSION

The terms in dispute and their corresponding constructions are set forth below.

### I. Contested Common Terms and ‘514 Patent Terms

a. “content video image”<sup>3</sup>

Plaintiff’s Proposed Construction	Defendant’s Proposed Construction
a visual representation of the content of the content addressable video	a virtual space representing the content of content addressable video that while traversed results in corresponding content addressable video being recorded or displayed

The parties agreed at the *Markman* hearing that a “content video image” is, at a minimum, a “virtual representation.” However, the parties dispute the addition of the phrase “that while traversed in corresponding content addressable video being recorded or displayed.” See PLAINTIFF’S CLAIM CONSTRUCTION BRIEF (DOC. NO. 320) (“PLTFF’S BRIEF”) at 12-13; DEFENDANTS’ RESPONSIVE CLAIM CONSTRUCTION BRIEF (DOC. NO. 327) (“RESPONSE”) at 10-12. As explained below, the Court declines to read in additional terms into the claim language and construes “content video image” as “a virtual representation of the content of the content addressable video.”

Although Defendants do not contend that video may only be displayed by traversing the content video image, they nevertheless argue that that inclusion of “while traversed” is necessary to reflect the patents’ disclosure of a “highly interactive” system. RESPONSE at 10-11. Plaintiff concedes that the patents disclose traversing the content image but argues that the addition of “while traversed” not only renders the claim term incomprehensible, but also impermissibly excludes other embodiments disclosed in the specification. PLTFF’S BRIEF at 12-13; PLAINTIFF’S REPLY BRIEF (“REPLY”) at 2-3.

The specification discloses a content video image that can be “traversed,” *i.e.* a cursor can be scanned along a grid representing the content video image, and/or “selected,” *i.e.* a cursor

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<sup>3</sup>This term is found in Claims 1 and 6 of the ‘514 patent and Claim 2 of the ‘914 patent.

position can call up video. *See* ‘514 patent 2:50-52; *see also id.* at 5:36-41 (“Finally a user input device is provided for selecting a video frame in response to a position on the content image”); *id.* at Figure 4, Block 404. Moreover, Plaintiff notes that the embodiment discussed in Section D of the ‘514 patent describing an “automatic assembly routine . . . for teaching music” teaches that the content video image can be either selectable or traversable. *See* PLTFF’S BRIEF at 13; *see also* ‘514 patent 9:45-46. The embodiment teaches that “a sequence of frames is displayed in response to a user selecting the position,” *i.e.*, is selectable, and that “[i]n a more simple case as described above, only a single frame may be displayed in response to positioning of the cursor,” *i.e.*, traversing. ‘514 patent 11:14-19.

Because the specification describes multiple embodiments not limited to traversing a content video image and the patentee has not demonstrated a “clear intention to limit the claim scope using ‘words or expressions of manifest exclusion or restriction,’” the Court declines to adopt Defendants’ construction. *Liebel-Flarsheim v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) (quoting *Teleflex, Inc.*, 299 F.3d at 1327). As a result, the Court construes “content video image” as “a virtual representation of the content of the content addressable video.”

**b. “The content video image including positions indicating content of corresponding frames of video in the plurality,” and similar phrases**

Claim Term Requiring Construction	Plaintiff’s Proposed Construction	Defendant’s Proposed Construction
the content video image having positions within the content video image corresponding to desired content of video images to be displayed [‘992 patent Claim 2]	the content video image having positions within the content video image corresponding to the content of video to be generated for display	the content video image having selectable positions within the content video image corresponding to the content of video to be generated for display

the content video image including positions for corresponding frames of video data in the plurality ['514 patent Claim 1]	No construction necessary	the content video image including selectable positions for corresponding frames of video data
the content video image including positions indicating the content of corresponding frames of video data in the plurality ['514 patent Claim 6]	No construction necessary	The content video image including selectable positions indicating the content of corresponding frames of video data

Defendants argue that the claimed positions in the content video image must be selectable and, as a result, ask the Court to insert the term “selectable” into the above claim terms. *See* RESPONSE at 12. It appears from the briefing and argument heard at the *Markman* hearing that Defendants’ main concern is that the content based image reflects more than just a “flat” or “concrete” image, but also includes “‘virtual positions’ used to access video.” RESPONSE at 8 (citing ‘514 patent at 2:11-20); *see also id.* at 12 (“This ability to select particular frames of video by selecting a content video image is fundamental to the purpose for the system – i.e., to provide a ‘highly interactive’ video system . . .”). Moreover, Defendants clarified at the hearing that they were not seeking to limit the claims to discrete selectable positions, but rather merely asking the Court clarify that the positions were active.

As explained above, the specification discloses both “traversing” and “selecting” areas of the content video image. For the same reason that the Court declines to read “while traversing” into content video image, the Court declines to limit by inserting “selectable.” Moreover, the plain language of the other claim terms combined with the Court’s construction of “content video image” as a “virtual representation of the content of the content addressable video” indicates that the content

video image is interactive and therefore more than just a “flat” image. As a result, the Court finds no construction necessary. See *O2 Micro Int’l Ltd.*, 521 F.3d at 1362.

**c. “in response to the tags”<sup>4</sup>**

Plaintiff’s Proposed Construction	Defendant’s Proposed Construction
based on the tags	no construction necessary

Defendants’ argue that no construction is necessary and “in response to the tags” should be understood according to its ordinary meaning, which Defendants’ argue “describe[s] a cause and effect relationship between the tags and the content video image.” RESPONSE at 22. As Defendants point out, the patent discloses that “a processing unit assembles a content video image in response to the tags.” *Id.* However, there is no support for the assertion that there is a cause and effect relationship between the processing unit and the tags. In other words, the specification does not support, let alone require, that the tags cause the processing unit to assemble the content video. Rather, the content video image is assembled or generated based on the tags. See ‘514 patent, Fig. 4, Element 402 (“Generate content image based on keys”); see also *id.* at 5:19-25. Failing to construe the phrase could result in the erroneous assumption that “in response to the tags” implies a cause and effect relationship which is not supported in the specification. Accordingly, the Court construes the phrase “in response to tags” as “based on the tags.”

**e. “tag storage” and similar terms**

Claim Term Requiring Construction	Plaintiff’s Proposed Construction	Defendant’s Proposed Construction
tag storage which stores tags	Patent Harbor does not	tag storage which stores a tag

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<sup>4</sup>This term is found in Claims 1 and 6 of the ‘514 patent.

for associated frames of video data in the plurality [‘514 patent Claim 1]	believe that construing this phrase would be helpful to a jury. Alternatively, storage should be construed as "memory"	for each frame of video data in the plurality
storing tags in memory for frames of video data in the plurality [514 patent Claim 6]	Patent Harbor does not believe that construing this phrase would be helpful to a jury.	storing a tag in memory for each frame of video data in the plurality

Plaintiff argues that there is no indication in the specification or elsewhere to limit the claim scope to tagging each individual frame. PLTFF’S BRIEF at 21-22. Plaintiff points to the language in the specification that states “a key is assigned to video frames or segments of frames that are stored.” *Id.* (quoting ‘514 patent at 5:10-11). Moreover, Plaintiff cites to Section D, the piano embodiment: “In this embodiment, a sequence of frames is displayed in response to a user selecting the position which range from frame 0-220 as shown in Table II. In a more simple case as described above, only a single frame may be displayed in response to position of the cursor.” ‘514 patent 11:14-19; *see also* REPLY at 4. Plaintiff therefore argues that the patents “clearly contemplate an embodiment where *multiple frames* are played back in response to the selection of a single position in the content video image.” REPLY at 4.

Defendants argue that a one-to-one relationship between frames and tags is confirmed through the specification and in each embodiment. RESPONSE at 25. *See e.g.*, ‘514 patent at 1:66-2:1 (“Each frame of video data is stored with a tag which indicates the contents of the video image defined by the associated frames”); *id.* at 2:13 (“each frame can be tagged with a position stamp”); *id.* at 5:15-18 (“a sequence of video along a given highway having a known start point and stop point can be assigned keys based on the position of each frame”); *id.* at 6:67-7:2 (“relationship of each

frame to its corresponding content image in a graphic space using keys and the system's processing unit"); *id.* at 8:34-35 ("position stamps are included with each individual frame"); *id.* at 10:58-59 ("a key is assigned to each video frame corresponding to block 401 of FIG. 4"). Furthermore, Defendants rely on the declaration of Michael T. MacKay in the '514 patent's prosecution history for the proposition that a person having ordinary skill in the art would understand "means for associating tags" as resulting in an "association of a tag (key) with each video frame." RESPONSE at 25 (quoting EX. E TO RESPONSE (Doc. No. 327-5), DECLARATION OF MICHAEL T. MACKAY BEFORE THE USPTO ("MACKAY USPTO DECL."), at ¶ 6).

Although the specification discusses tagging each individual frame in various places throughout the specification, in discussing the piano embodiment disclosed in Section D, the patentee clearly indicated that entire segments of frames could be tagged. *See* 514 patent 11:14-19. In describing the mechanics of storing and recalling frames in the context of the transition from one video segment (E1) to another (E2), the specification discloses: "[t]he transition from E1 to E2 is in the original frames 60-360, and the second event stored in frames 360-420. This sequence is divided so that new frame numbers 0-220 are stored with a key identifying them as transitions E1 to E2." *Id.* at 10:65-11:2 (emphasis added). This language is consistent with Plaintiff's interpretation, indicating that the collective frame sequence 0-220 is stored with one key identifying the content of the frame sequence as transitions from E1 to E2.

Defendants further argue that when the specification discloses tagging sequences of frames as in the piano embodiment, each individual frame of the sequence is tagged with an identical tag. RESPONSE at 25. However, a sequence of multiple frames with each frame sharing identical tags would eliminate the interactive functionality of the invention because one tag would correspond to

multiple starting points in the video film library, i.e. after a user selects a position on the content video image, the system would be unable to start the proper section. *See* ‘514 patent 2:61-64 (“This allows for a higher interactive video systems in which frames of video data are addressed by content in an easily understandable and fun to use manner.”) Moreover, Defendants’ reliance on the MacKay PTO Declaration is unavailing. The declaration merely describes one embodiment of the claimed invention in response to a written description rejection based on the term “means for associating tags” and does not foreclose the possibility of tagging sequences of frames. *See* MACKAY PTO DECL. at ¶4. Additionally, Defendants’ quotation is somewhat misleading. Placed in the proper context, MacKay appears to be stating that a person having ordinary skill in the art would understand that Figure 4’s use of the term “key” equates to the claims’ use of the term “tags”:

In the specification, the ‘means for associating tags,’ and the step of associating tags with frames of video data is clearly described. In particular, in Fig. 4, step 401 reads “Assign Key to Each Video Frame.” A person having ordinary skill in the art would readily understand that this results in association of a tag (key) with each video frame.

MACKAY PTO DECL. at ¶ 6; *see also* PLTFF’S BRIEF at 17 (citing MACKAY PTO DECL. at 2-5)(arguing that a person having ordinary skill in the art would understand “key” to equal “tag”).

Because the specification teaches both tagging each frame and tagging sequences of frames, the Court declines to construe the claims to require that each frame be tagged. Having rejected Defendants’ “each frame” requirement, the Court finds the jury would understand the claim terms as written without construction. *See O2 Micro Int’l Ltd.*, 521 F.3d at 1362.

## **II. Contested ‘992 Patent Terms**

### **a. “generating content addressable video”**



Plaintiff's Proposed Construction	Defendants' Proposed Construction
No construction necessary	recording frames of video data that may be addressed based upon their content

The term “generating content addressable video” occurs in the preamble of Claim 2 of the ‘992 patent which reads, in its entirety, “[a]n apparatus for generating content addressable video comprising.” ‘992 patent at 14:49-50. As a result, the Court is confronted with two issues: (1) whether the preamble is limiting, and (2) if so, whether it limits the claim to a recording device. As explained in below, the Court does not find the preamble limiting and therefore declines to construe the term “generating content addressable video.”

Generally a preamble is considered limiting when it “recites essential structure or steps, or if it is ‘necessary to give life, meaning and vitality to claims or counts.’” *Catalina Marketing Int’l. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002)(quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1309 (Fed. Cir. 1999)); *Kropa v. Robie*, 187 F.2d 150, 1952 (C.C.P.A. 1951). However, “a preamble is not limiting ‘where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.’” *Id.* (quoting *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)). With these principles in mind, the Court turns to the claim language to determine if the preamble provides further limitation.

Plaintiff argues that the preamble should not be construed as limiting because the body of the claim recites a structurally complete invention. PLTFF’S BRIEF at 22. Defendants argue that the preamble is limiting because it provides both the antecedent basis for “controllable image generator” and also “provides context in which the claimed invention is implemented.” *See* RESPONSE at 26-29;

DEFENDANTS' MARKMAN PRESENTATION SLIDES ("DFDT'S SLIDES") at 7 (citing *SSL Services, LLC v. Citrix Sys., Inc.*, No. 2:08-cv-158 (E.D. Tex. Sept. 20, 2011)).

First, the Court agrees that Claim 2 recites a structurally complete invention and finds that the claim does not rely on the preamble for any antecedent bases. The absence of the term "controllable image generator" from the preamble combined with the absence of a definite article before "controllable image generator" in the claim language supports this conclusion. Moreover, in contrast to *SSL Services* relied on by Defendants, the preamble recites no claim structure or claim steps and only recites the invention's intended use, i.e. "generating content addressable video." *See SSL Services*, slip. op. at 4, 12-13 (finding that a preamble reciting "a method of carrying out communications over a multi-tier virtual private network, said network including a server and a plurality of client computers, the server and client computers each including means for transmitting data to and receiving data from an open network, comprising the steps of:" limiting because it provided the only antecedent basis for the terms "multi-tier virtual private network," "server", and "plurality of client computers.")

Second, Defendants' argument that the preamble must be limiting because it is necessary to provide context to the invention is misplaced. The court in *SSL Services* found the preamble provided "the context in which the claimed invention is implemented" in part because "the body of the claims rely on the preamble to provide proper antecedent basis for terms appearing in the body of the claims." *SSL Services*, slip. op. at 12. This is consistent with the court's citation of *Seachange International v. C-Cor Inc.* for the proposition that a preamble is limiting where "the preamble provide[s] the only antecedent basis and thus the context essential to understand the meaning of the term." *Id.* (citing *Seachange Int'l v. C-Cor Inc.*, 413 F.1361, 1376 (Fed. Cir. 2005)).

To the extent that Defendants are arguing that a preamble providing context to the invention must be construed, that view was squarely rejected by the Federal Circuit:

[T]he purpose of a claim preamble is to give context for what is being described in the body of the claim; if it is reasonably susceptible to being construed to be merely duplicative of the limitations in the body of the claim (and was not clearly added to overcome a rejection), we do not construe it to be a separate limitation.

*Symantec Corp. v. Computer Assocs. Int'l, Inc.*, 522 F.3d 1279, 1288-89 (Fed. Cir. 2008). Here, because the preamble recites only the use or purpose of the structure and the Defendants have pointed to no clear and unmistakable reliance on that use to distinguish prior art, construing the preamble would be inappropriate. *See Catalina*, 289 F.3d at 509.

Moreover, Defendants' reliance on *General Electric v. Nintendo* is unavailing. *See* RESPONSE at 27 (citing *General Elec. Co. v. Nintendo Co., Ltd.*, 179 F.3d 1350, 1361-62 (Fed. Cir. 1999)). In that case, General Electric asserted several patents against Nintendo, including a patent directed towards "a method for displaying computer generated information on a display screen." *General Elec. Co.*, 179 F.3d at 1359. The court found the preamble limiting because the specification's description of the invention was limited to binary display devices but the disputed claim only mentioned "binary displays" in the preamble. *Id.* at 1361-1362 (finding that the specification "makes it clear that the inventors were working on the particular problem of displaying binary data"). In this case, however, the specification does not "make it clear" that the invention is only limited to "generating" content based video as Defendants argue. The '992 patent shares the same specification as the '514 patent and both parties agree that the '514 specification discloses at a minimum both an assembly and a recording devices. Thus it cannot be said that the specification is so limited as to require the Court to interpret the preamble in this case.

Lastly, the essential dispute is whether Claim 2 recites a display device or a recording device. The Court finds that the issue is better resolved by interpreting the terms in the body of the claim rather than forcing life into the preamble. For the aforementioned reasons, the Court does not find the preamble limiting and thus declines to construe the term “generating content addressable video.”

**b. “controllable image generator”**

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary	a controllable camera

Plaintiff argues that no construction is necessary because “a jury is more than capable of understanding words like ‘controllable,’ ‘image,’ and ‘generator’ alone, and would be just as capable of putting the words together and understanding that they referred to something that could be controlled and that could generated images.” PLTFF’S BRIEF at 26. Plaintiff primarily argues that “[w]hen Claim 2 is properly construed in light of Figure 2, it is clear that no camera of any kind is called for by the claim elements.” REPLY at 7. In the briefing and at the *Markman* Hearing, Plaintiff stressed that the other Claim 2 elements require a construction of “controllable image generator” that is consistent with a display device. *See, e.g.*, PLTFF’S BRIEF at 22-23. Plaintiff emphasizes that the claimed apparatus includes “a content image display for displaying a content image display representative of an organization of content addressable video” and a “controller that generates signals indicating content for video images in response to respective positions within the content image display.” *Id.* at 23. Plaintiff argues further that the controllable image generator “produces video images in response to video image data.” *Id.* Thus, Plaintiff argues that the “claim is clearly

directed to an apparatus that can produce video images (i.e., generates video for display) from pre-recorded video data, as recited in the claims.” *Id.* PLTFF’S BRIEF at 26.

Defendants counter that while “controllable image generator” is never used in the specification, the specification draws a clear distinction between assembling, generating, and displaying. RESPONSE at 27-37. For example, the Summary of Invention describes one aspect of the invention by stating “the present aspect of the invention comprises an apparatus or method for generating content addressable video, which is the converse of assembling the content addressable video.” ‘992 patent 2:29-32. Moreover, the specification describes a “generating content addressable video” aspect of the invention that includes a “controllable camera, such as a robot mounted camera.” ‘992 patent 2:36-37. In contrast, when describing an embodiment for assembling content addressable video, there is no mention of any controllable elements. *See id.* at 1:66-2:14. Defendants also argue that interpreting “controllable image generator” as a controllable camera is consistent with the patentee’s use of the term throughout the patent family. RESPONSE at 37. They argue that because Claim 3 of the ‘514 patent includes “controllable video image generator” and Claim 4 of the ‘514 patent states that “the controllable video image generator comprises a robot mounted video camera,” the term “controllable image generator” as used in Claim 2 of the ‘992 patent should be construed as a recording device.

*i. Claim 2 is not Clearly Directed towards a Display Device*

First, the Court is not persuaded that Figure 2 is representative of Claim 2. Plaintiff argues that “figure 2 includes a controllable image generator (for example, computer 201) that may, in some embodiments, produce video images from the video data stored on disks 202 and 203.” PLTFF’S BRIEF at 26. However, it is telling that Plaintiff cites to no portion of the specification that describes

a computer as anything remotely akin to a controllable image generator. Moreover, the specification identifies the computer only to say it is connected to a content monitor and that a “cursor input device” is coupled with the computer. *See* ‘992 patent 4:17-18, 23-24. Also telling is the specification’s description of Figure 2 as a “schematic diagram of a system for interactively displaying content addressable video according to the present invention.” ‘992 patent 3:11-14 (emphasis added); *see also id.* at 4:15-17 (“Fig. 2 illustrates the preferred system for displaying the content addressable video according to the present invention”)(emphasis added). Given that the specification describes Figure 2 as a display system and provides no explanation of how the “computer” could generate video as required by Claim 2, the Court does not find Plaintiff’s argument persuasive.

Plaintiff’s lack of support for applying Figure 2 to Claim 2 is further illustrated by the ease with which Figure 1 explains Claim 2. Just as Claim 2 uses the term “controllable image generator,” Figure 1 is described as a “schematic diagram of a system for generating, or assembling content addressable video according to the present invention.” ‘992 patent 3:11-14 (emphasis added). Moreover, “Fig. 1 shows a camera 109 whose position is controlled to generate a plurality of frames of video information.” ‘992 patent 3:34-36 (emphasis added). Thus, where Fig. 2 describes a computer which Plaintiff argues, without support from the specification, that “may, in some embodiments, produce video images,” Figure 1 clearly identifies a system for generating content based video using a controllable camera to generate video frames.

Second, Plaintiff’s attempt to draw support from the claim language falls flat. The first two claim elements which Plaintiff relies on in support of its display argument are found verbatim in Claim 3 of the ‘514 patent, which both parties acknowledge is a recording claim. *Compare* ‘992

patent 14:51-59 (Claim 2) *with* ‘514 patent 14:3-11 (Claim 3). Moreover, Plaintiff’s display argument and non-construction would force an erroneous interpretation of “video image data.” Plaintiff contends that Claim 2 of the ‘992 patent only requires the controllable image generator to have the ability to “produce video images” from the content addressable video and that this “production” can be performed by a display device. PLTFF’S BRIEF at 26-27. In other words, Plaintiff argues that the “controllable image generator produces video images from already-existing video image data.” REPLY at 8. In order to reach this conclusion, “video image data” would have to be interpreted as prerecorded video. However, this interpretation of video image data is inconsistent with the specification and the way the claims are drafted across the patent family. *See NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1293 (Fed. Cir. 2005)(“Because [the] patents all derive from the same parent application and share many common terms, we must interpret the claims consistently across all the patents”). As Defendants point out, the specification does not contain the term “video image data;” however, when referring to prerecorded frames in other claims in the patent family, the patentee refers to “frames of video data” in some form of storage. *See, e.g.*, the ‘514 patent 13:45-46 (Claim 1)(“frames of video data in storage locations”); *id.* at 14:36-37 (Claim 6)(same); *id.* at 13:65-66 (Claim 2)(“frames of video in the video storage”); *id.* at 14:33-34 (Claim 5)(same); *id.* at 16:12-13 (Claim 11)(“frames of video in the storage locations”); *id.* at 14:56-57(Claim 7) (“the frames of video data in the addressable memory”); *id.* at 14:24 (Claim 3)(“stored frames of video data”). Thus, construing “controllable image generator” to include display-type devices would require an interpretation of “video image data” that is at odds with the specification and inconsistent with the patent family’s other claims.

- ii. *Construing “Controllable Image Generator” as “Video Recording Device” is Supported by the Intrinsic Record*

Interpreting “controllable image generator” as a “controllable video recorder” is consistent with the claims’ and the specification’s use of “controllable” and “control signals.” The specification consistently uses “controllable” or a variant in the context of a recording device. ‘992 patent at Abstract (“controllable camera”); *id.* at 2:35 (same); *id.* at 2:39-41 (“same”); *id.* at 5:61 (“uncontrolled or free camera environments”); *id.* at 6:35 (“controlled camera environment”); *id.* at 6:39-40 (“where cameras are controlled in stationary or motion controlled environments”); *id.* at 3:35-36 (“The camera position is controlled”). Moreover, the term “control signals” appears five times in the specification of the ‘992 patent and each time it is used in the context of a camera. *See* ‘992 patent Abstract (“A controllable camera, such a robot mounted camera, then generates the frames of video in response to the position control signals derived from the content video image”); *id.* at 2:57-60 (“The camera, mounted on a robot, then traverses real space corresponding to the virtual space of the content video image in response to the control signals, while filming the transmission”); *id.* at 3:66- 4:1 (“The content image 106 can be generated before filming the object 102, and thereby used to generate camera position control signals to control the generation of video”); *id.* at 4:48-50 (“Next, the keys are used by the computer 100 to generate camera position control signals which control the robot to film the object in response to the keys (block 302)”).

Similarly, interpreting “controllable image generator” as a “controllable video recorder” is consistent with the phrase’s usage across the patent family. Claim 3 of the ‘514 patent, which both parties agree recites a recording device, includes the phrase “controllable video image generator.” ‘514 patent 14:13. Claim 4 of the ‘514 patent recites “The apparatus of claim 3, wherein the controllable video image generator comprises a robot mounted video camera.” *Id.* at 14:26-28. Thus, the patentee clearly meant for controllable video image generator to at least encompass a



video camera. Although controllable video image generator must be broader than a robot mounted video camera as Plaintiff argues, it must nevertheless be consistent with the internal record. As shown above, the specification and common usage across the asserted patents supports a finding that controllable image generator is more than merely a display device.

While none of the above is individually dispositive, the cumulative effect of Plaintiff's interpretation's ambiguity and internal inconsistency combined with the strong support in the specification for viewing Claim 2 as a recording claim, drives the Court to construe "controllable image generator" as a "controllable video recording device."<sup>5</sup>

**c. "content image display which displays a content video image"**

Plaintiff's Proposed Construction	Defendants' Proposed Construction
"content video image" should be construed as proposed above, and if the term "content image display" is to be construed, it should simply be construed as "a display"	a computer monitor for displaying a content video image while content addressable video is generated and/or displayed

Plaintiff argues that "content image display" should be construed simply as "display" and that there is nothing in the specification, prosecution history, or claim language which requires a "content image display" to be a computer monitor. PLTFF'S BRIEF at 25. Moreover, Plaintiff acknowledges that Fig. 2 shows an embodiment having both a display for displaying a content video image and a display to display content addressable video, but argues that there is nothing in record that the embodiment must do so. *Id.* Defendants are unable to point to a clear disavowal in the specification or prosecution history, instead they argue that every embodiment requires two displays.

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<sup>5</sup> The Court, however, declines to limit the term to "cameras" as suggested by Defendants because, as plaintiff argues, the '992 patent appears to disclose other recording devices such as a computer executing CAD software. *See* '514 patent 5:59 - 6:10.

RESPONSE at 30-31. As such, Defendants argue that a broader interpretation would violate the written description requirements of 35 U.S.C. § 112. *Id.* at 31.

Despite the specification’s recitation of only a single embodiment, “the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using ‘words or expressions of manifest exclusion or restriction.’” *Liebel-Flarsheim*, 358 F.3d at 906 (Fed. Cir. 2004) (quoting *Teleflex, Inc.*, 299 F.3d at 1327)). Having resolved the underlying dispute over the scope of “content image display which displays a content video image,” the Court finds that no construction is necessary. *See O2 Micro Int’l Ltd.*, 521 F.3d at 1362.<sup>6</sup>

**d. “in response to respective positions within the content video image”**

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
"content video image" should be construed as proposed above, and the remainder of the phrase requires no construction	in response to respective positions of a cursor or camera icon within the content video image

Plaintiff argues that writing “cursor” and “camera icon” into the claim is inappropriate because they are merely disclosed as exemplary embodiments in the specification. PLTFF’S BRIEF at 29. Defendants, on the other hand, argue that “[w]ithout exception, the ‘992 patent describes indicating positions in the content video image using a cursor or camera icon.” RESPONSE at 34. Plaintiff counters that the patentee did not demonstrate a clear intention to limit the claim scope and a “person having ordinary skill in the art, having read the specification of the Asserted Patents, would clearly understand that any suitable position indicator would suffice for usage in the described systems.” REPLY AT 4-5. Just as before, the Court finds no clear disavowal in the specification or

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<sup>6</sup> Defendants’ written description and enablement arguments are better suited for a motion for summary judgment.

prosecution history to limit the claim to “camera icon” or “cursor.” *See Liebel-Flarsheim*, 358 F.3d at 906. After rejecting Defendants’ proposal and resolving the scope of disputed term, the Court finds that no construction is necessary. *See O2 Micro Int’l Ltd.*, 521 F.3d at 1362.

**e. Remaining ‘992 terms**

Having resolved the underlying dispute over whether Claim 2 of the ‘992 patent is directed towards a recording device or a display device, the Court finds it unnecessary to construe the remaining disputed ‘992 terms. *See id.* As will be described in more detail below, the plain meaning of the terms in the context of a recording device resolves any remaining dispute.

*i. “Control signals indicating content for video image”*

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
control signals indicating video image data from the content addressable video	control signals indicating relative positioning of a controllable image generator in relation to the subject

Plaintiff mainly argues that “Defendants are trying to twist a video playback claim into a recording claim.” PLTFF’S BRIEF at 28. Moreover, Plaintiff argues that including “video image data” is a useful to aid the jury in connecting the second claim element with the third claim element which recites a “controllable image generator.” *See* REPLY at 9. This again relies on the assumption that “video image data” is referring to “frames of video data.” *Id.* However, as indicated *supra*, there is no support in the specification or in comparison to other claims that the “video image data” should be equated with “frames of data.”

Defendants’ proposal centers on interpreting the claim as a recording claim. While the Court agrees that “control signals” is used in conjunction with controlling a video recording device, there is not enough support for the conclusion that the control signals are *only* responsible for changing

the relative position of video recording device. Absent a clear disavowal in the specification or the prosecution history, the court will not read in such a limitation. *See Liebel-Flarsheim*, 358 F.3d at 906.

ii. “which produces video images”

Plaintiff's Proposed Construction	Defendants' Proposed Construction
that generates video images for display	which records video images

Construing “controllable image generator” as a “video recording device” results in a claim segment that reads a “video recording device . . . which produces video images.” Because the scope of the term “which produces video” is inherently limited by the “controllable image generator” construed above, the Court finds no construction necessary. *See O2 Micro Int’l Ltd.*, 521 F.3d at 1362.

### III. Agreed Terms

The following constructions were agreed to at the *Markman* hearing.

Claim Term Requiring Construction	Court Construction Agreed to by the Parties
executing program steps which assemble and display a content video image in response to the tags (Claim 6)	executing program steps which automate the assembly and display of a content video image response to the tags
executing program steps which associate the positions in the content video image with addresses of storage locations storing corresponding frames of video data (Claim 6)	executing program steps which automate the association of the positions in the content video image with addresses of storage locations storing corresponding frames of video data
first program steps which assemble a content video image in response to the tags	first program steps which automate the assembly of a content video image in response to the tags
second program steps which associate positions in the content video image with addresses of storage locations storing	second program steps which automate the association of positions in the content video image with addresses of storage locations

corresponding frames of video data	storing corresponding frames of video data
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The following agreed construction was presented at the *Markman*:

Claim Term Requiring Construction	Construction Agreed to by the Parties
the tags indicating the contents of the video images defined by the associated frames	No construction necessary

### CONCLUSION

For the foregoing reasons, the Court adopts the constructions set forth above.

**So ORDERED and SIGNED this 24th day of October, 2011.**

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JOHN D. LOVE  
UNITED STATES MAGISTRATE JUDGE

# APPENDIX A

## U.S. Patent No. 5,684,514, Claim 1

	<b>Claim Term Requiring Construction</b>	<b>Patent Harbor's Proposed Construction</b>	<b>Defendants' Proposed Construction</b>	<b>Court's Construction</b>
1.	content video image	a visual representation of the content of the content addressable video	a virtual space representing the content of content addressable video that while traversed results in corresponding content addressable video being recorded or displayed	a virtual representation of the content of the content addressable video
2.	the content video image including positions for corresponding frames of video data in the plurality	Patent Harbor does not believe that construing this phrase would be helpful to a jury.	the content video image including selectable positions for corresponding frames of video data	No construction necessary
3.	first program steps which assemble a content video image in response to the tags	[AGREED]	[AGREED]	first program steps which automate the assembly of a content video image in response to the tags
4.	second program steps which associate positions in the content video image with addresses of storage locations storing	[AGREED]	[AGREED]	second program steps which automate the association of positions in the content video image with addresses of storage locations storing corresponding

	<b>Claim Term Requiring Construction</b>	<b>Patent Harbor's Proposed Construction</b>	<b>Defendants' Proposed Construction</b>	<b>Court's Construction</b>
	corresponding frames of video data			frames of video data
5.	in response to the tags	based on the tags	Does not require construction.	based on the tags
6.	the tags indicating the contents of the video images defined by the associated frames	<b>[AGREED]</b>	<b>[AGREED]</b>	No construction necessary
7.	tag storage which stores tags for associated frames of video data in the plurality	Patent Harbor does not believe that construing this phrase would be helpful to a jury.  Alternatively, storage should be construed as "memory"	tag storage which stores a tag for each frame of video data in the plurality	No construction necessary
8.	content addressable video	<b>[AGREED]</b>	<b>[AGREED]</b>	video data that is addressable based upon its content

U.S. Patent No. 5,684,514, Claim 6

	<b>Claim Term Requiring Construction</b>	<b>Patent Harbor's Proposed Construction</b>	<b>Defendants' Proposed Construction</b>	<b>Court's Construction</b>
1.	content video image	a visual representation of the content of the content addressable video	a virtual space representing the content of content addressable video that while traversed results in corresponding content addressable video being recorded or displayed	a virtual representation of the content of the content addressable video
2.	the content video image including positions indicating the content of corresponding frames of video data in the plurality	Patent Harbor does not believe that construing this phrase would be helpful to a jury.	the content video image including selectable positions indicating the content of corresponding frames of video data	No construction necessary
3.	executing program steps which assemble and display a content video image in response to the tags	<b>[AGREED]</b>	<b>[AGREED]</b>	executing program steps which automate the assembly and display of a content video image response to the tags
4.	executing program steps which associate the positions in the content video image with addresses of storage locations storing corresponding frames of video data	<b>[AGREED]</b>	<b>[AGREED]</b>	executing program steps which automate the association of the positions in the content video image with addresses of storage locations storing corresponding frames of video data
5.	in response to the tags	based on the tags	Does not require construction.	based on the tags
6.	storing tags in memory for frames of video data	Patent Harbor does not believe that construing	storing a tag in memory for each frame of video data in	No construction necessary



	<b>Claim Term Requiring Construction</b>	<b>Patent Harbor's Proposed Construction</b>	<b>Defendants' Proposed Construction</b>	<b>Court's Construction</b>
	in the plurality	this phrase would be helpful to a jury.	the plurality	
7.	the tags indicating the contents of the video images defined by the associated frames	[AGREED]	[AGREED]	No construction necessary
8.	content addressable video	[AGREED]	[AGREED]	video data that is addressable based upon its content

U.S. Patent No. 5,977,992, Claim 2

	<b>Claim Term Requiring Construction</b>	<b>Patent Harbor's Proposed Construction</b>	<b>Defendants' Proposed Construction</b>	<b>Court's Construction</b>
1.	content video image	a visual representation of the content of the content addressable video	a virtual space representing the content of content addressable video that while traversed results in corresponding content addressable video being recorded or displayed	a virtual representation of the content of the content addressable video
2.	the content video image having positions within the content video image corresponding to desired content of video images to be displayed	the content video image having positions within the content video image corresponding to the content of video to be generated for display	the content video image having selectable positions within the content video image corresponding to the content of video to be generated for display	No construction necessary
3.	generating content addressable video	Patent Harbor does not believe that construing this phrase would be helpful to a jury.	recording frames of video data that may be addressed based upon their content	No construction necessary
4.	controllable image generator	Patent Harbor does not believe that construing this phrase would be helpful to a jury.	a controllable camera	a controllable video recording device
5.	which produces video images	that generates video images for display	which records video images	No construction necessary
6.	content image display which displays a content video image	"content video image" should be construed as proposed above, and if the term "content image display" is to be construed, it should simply be	a computer monitor for displaying a content video image while content addressable video is generated and/or displayed	No construction necessary

	<b>Claim Term Requiring Construction</b>	<b>Patent Harbor's Proposed Construction</b>	<b>Defendants' Proposed Construction</b>	<b>Court's Construction</b>
		construed as "a display"		
7.	control signals indicating content for video images	control signals indicating video image data from the content addressable video	control signals indicating relative positioning of a controllable image generator in relation to the subject	No construction necessary
8.	indicating content for video images	indicating video image data from the content addressable video	indicating relative positioning of a controllable image generator in relation to the subject	No construction necessary
9.	in response to respective positions within the content video image	"content video image" should be construed as proposed above, and the remainder of the phrase requires no construction	in response to respective positions of a cursor or camera icon within the content video image	No construction necessary
10.	content addressable video	<b>[AGREED]</b>	<b>[AGREED]</b>	video data that is addressable based upon its content

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
TYLER DIVISION**

**PATENT HARBOR, LLC**

**Plaintiff,**

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§

**v.**

**AUDIOVOX CORP., et al.,**

**Defendants.**

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§

**CIVIL ACTION NO.**

**6:10-cv-00361 LED-JDL**

**JURY TRIAL DEMANDED**

**v.**

**LG ELECTRONICS, INC., et al.,**

**Defendants.**

§  
§  
§  
§  
§

**CIVIL ACTION NO.**

**6:10-cv-00436 LED-JDL**

**JURY TRIAL DEMANDED**

**v.**

**TWENTIETH CENTURY FOX  
HOME ENTERTAINMENT LLC, et  
al.,**

**Defendants.**

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**CIVIL ACTION NO.**

**6:10-cv-00607 LED-JDL**

**JURY TRIAL DEMANDED**

**ORDER**

The above entitled and numbered civil action has been referred to United States Magistrate Judge John D. Love pursuant to 28 U.S.C. § 636. The Memorandum Opinion and Order containing the Magistrate Judge's claim construction ruling (Doc. No. 341) ("Claim Construction Order") has been presented for consideration. Plaintiff Patent Harbor, LLC ("Patent Harbor") and Defendants<sup>1</sup>

<sup>1</sup> Across the three cases listed above, all Defendants except for the following joined in the objections: Audiovox Corp.; Audiovox Electronics Corp.; Denon Electronics USA, LLC; DPI, Inc.; Funai Corp.; GPX, Inc.; LG Electronics, LG Electronics U.S.A., Inc.; Onkyo USA Corp.; Vizio, Inc. See (Doc. No. 347) at 1 n.1.

have filed objections (Doc. Nos. 348, 347) to the Claim Construction Order. Defendants' objections largely reassert arguments set forth in the Claim construction briefing. Plaintiff's objections focus on the Magistrate Judge's construction of the phrase "controllable image generator." *See* (Doc. No. 348) at 2-3. Plaintiff argues, in part, that the term "video image data" must be construed because the Magistrate Judge stated at the hearing that "video image data" is a "critical component" to interpreting "controllable image generator." (Doc. No. 348) at 6. The Court notes that the Magistrate Judge resolved the claim scope dispute by expressly rejecting Plaintiff's interpretation of the term "video image data" on two separate occasions in the Claim Construction Order . CLAIM CONSTRUCTION ORDER at 20, 24. Thus, the parties no longer "present a fundamental dispute regarding the scope of a claim term." *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008).

Accordingly, the Court **ADOPTS** the Opinion of the United States Magistrate Judge as the opinion of this Court, with the above clarifying comments. All objections are overruled and all motions for reconsideration are **DENIED**.

**So ORDERED and SIGNED this 16th day of March, 2012.**

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**LEONARD DAVIS**  
**UNITED STATES DISTRICT JUDGE**

IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
TYLER DIVISION

PATENT HARBOR, LLC,

*Plaintiff,*

v.

AUDIOVOX CORPORATION, *et al.*,

*Defendants.*

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Civil Action No. 6:10-cv-00361-LED

**JURY TRIAL DEMANDED**

**FINAL JUDGMENT**

It is hereby **ORDERED, ADJUDGED, and DECREED** that, based upon the entry of a Joint Stipulation of Non-Infringement (Dkt. No. 399), Patent Harbor shall have and recover nothing on its claim for infringement of United States Patent No. 5,977,992 (“the ‘992 patent”) against Defendants: Audiovox Corporation; Audiovox Electronics Corporation; Best Buy Co., Inc.; Denon Electronics (USA), LLC; Imation Corporation; RadioShack Corporation; and VIZIO, Inc. Each party shall bear its own expenses, costs of court, and attorneys’ fees.

All relief not granted in this judgment is **DENIED**.

**This JUDGMENT is FINAL.**

**So ORDERED and SIGNED** this 21st day of March, 2013.

A handwritten signature in black ink, appearing to read 'Leonard Davis', written over a horizontal line.

**LEONARD DAVIS  
UNITED STATES DISTRICT JUDGE**

US005977992A

# United States Patent

[19] **Branscomb**

[11] **Patent Number:** **5,977,992**  
 [45] **Date of Patent:** **\*Nov. 2, 1999**

[54] **APPARATUS AND METHOD FOR ASSEMBLING CONTENT ADDRESSABLE VIDEO**

4,992,866 2/1991 Morgan ..... 358/108

[75] Inventor: **Hill Branscomb**, San Francisco, Calif.

[73] Assignee: **Advanced Interaction, Inc.**, San Francisco, Calif.

[\*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **08/925,828**

[22] Filed: **Sep. 5, 1997**

## Related U.S. Application Data

[63] Continuation of application No. 08/243,046, May 16, 1994, Pat. No. 5,684,514, which is a continuation of application No. 08/146,400, Nov. 1, 1993, abandoned, which is a continuation-in-part of application No. 08/000,927, Jan. 6, 1993, abandoned, which is a continuation-in-part of application No. 07/460,849, Dec. 8, 1989, abandoned.

[51] **Int. Cl.<sup>6</sup>** ..... **G09G 5/00**

[52] **U.S. Cl.** ..... **345/507; 345/145; 345/157**

[58] **Field of Search** ..... **345/185, 189, 345/145, 156, 157, 507**

## References Cited

### U.S. PATENT DOCUMENTS

4,600,919 7/1986 Stern ..... 340/725  
 4,857,902 8/1989 Naimark et al. .... 358/103  
 4,942,539 7/1990 McGee et al. .... 358/181

*Primary Examiner*—Matthew Luu

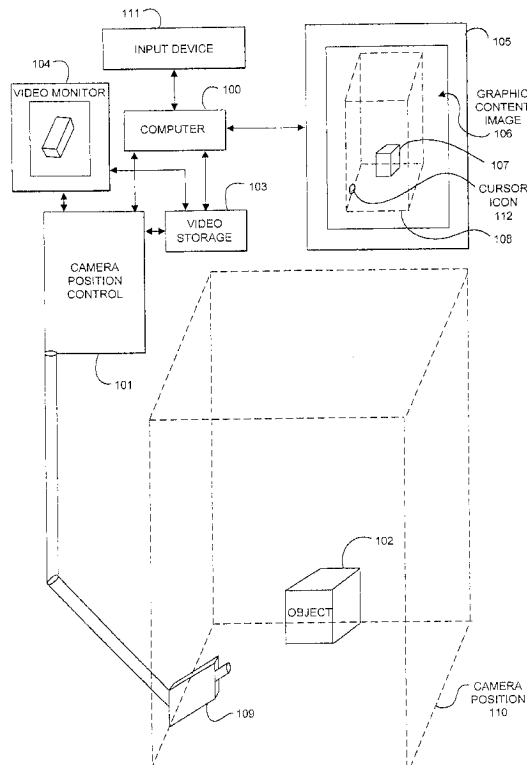
*Attorney, Agent, or Firm*—Mark A. Haynes; Haynes & Boffel LLP

## [57] ABSTRACT

A system and method for assembling or generating content addressable video based on storing a plurality of frames of video data at addressable storage locations. Each frame of video data is stored with a tag which indicates the contents of the video image defined by the associated frame. For assembly, a processing unit assembles a content video image in response to the tags; the content video image, including positions for corresponding frames of video data. Finally, a means, such as a look up table, is provided for associating the positions in the content video image with addresses of storage location storing the corresponding frames of video data. A user input device is provided by which the user selects a particular frame of video data, by selecting a position in the content video image, such as by positioning a cursor on the selected position.

For generating content addressable video, the content video image is first generated. Positions in the content video image are then translated by a control circuit into camera positioning signals. A controllable camera, such as a robot mounted camera, then generates the frames of video in response to the position control signals derived from the content video image. A processing unit then associates each frame of video data generated by the controllable camera, with positions in the content video image.

**2 Claims, 5 Drawing Sheets**



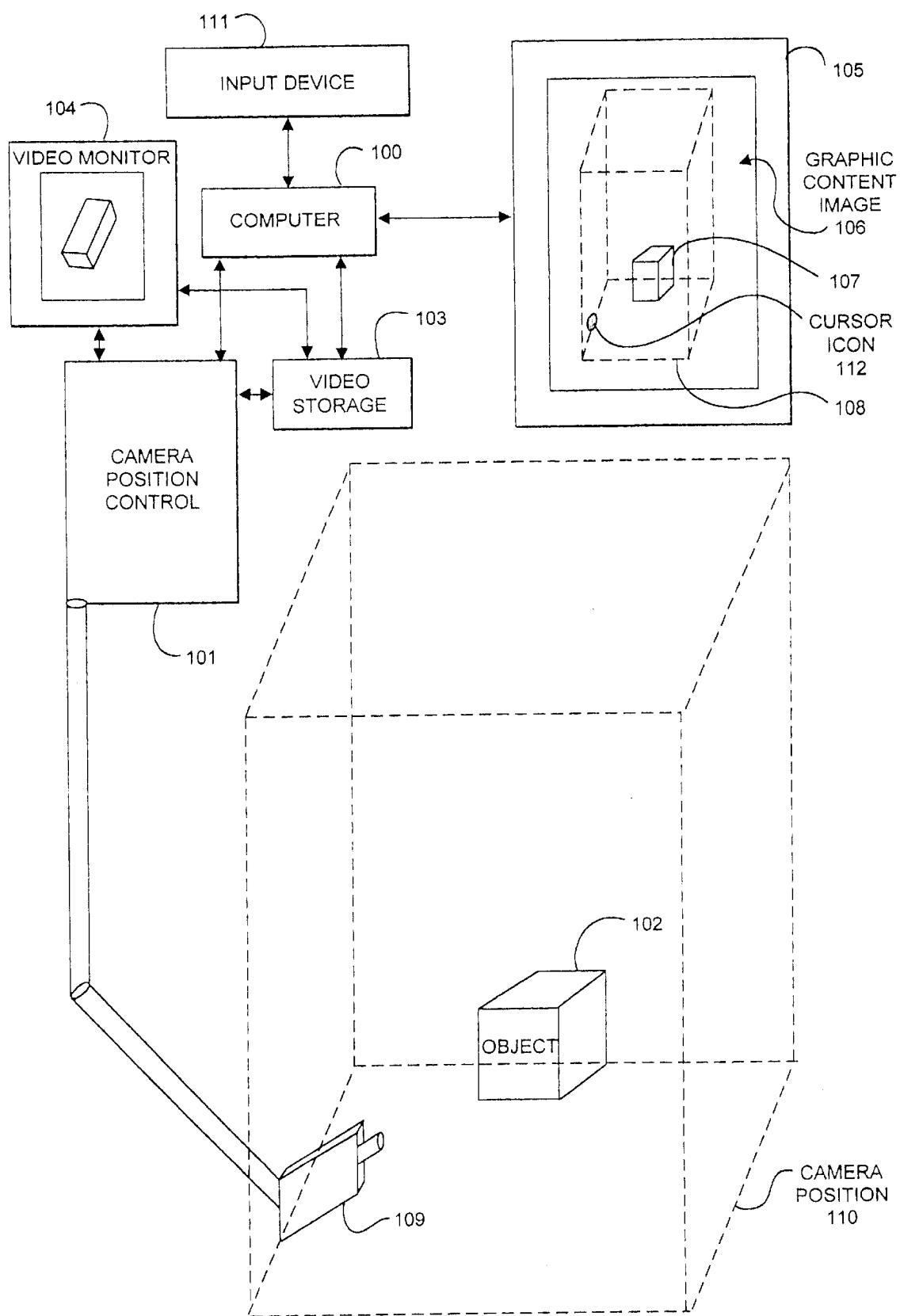


FIG. 1



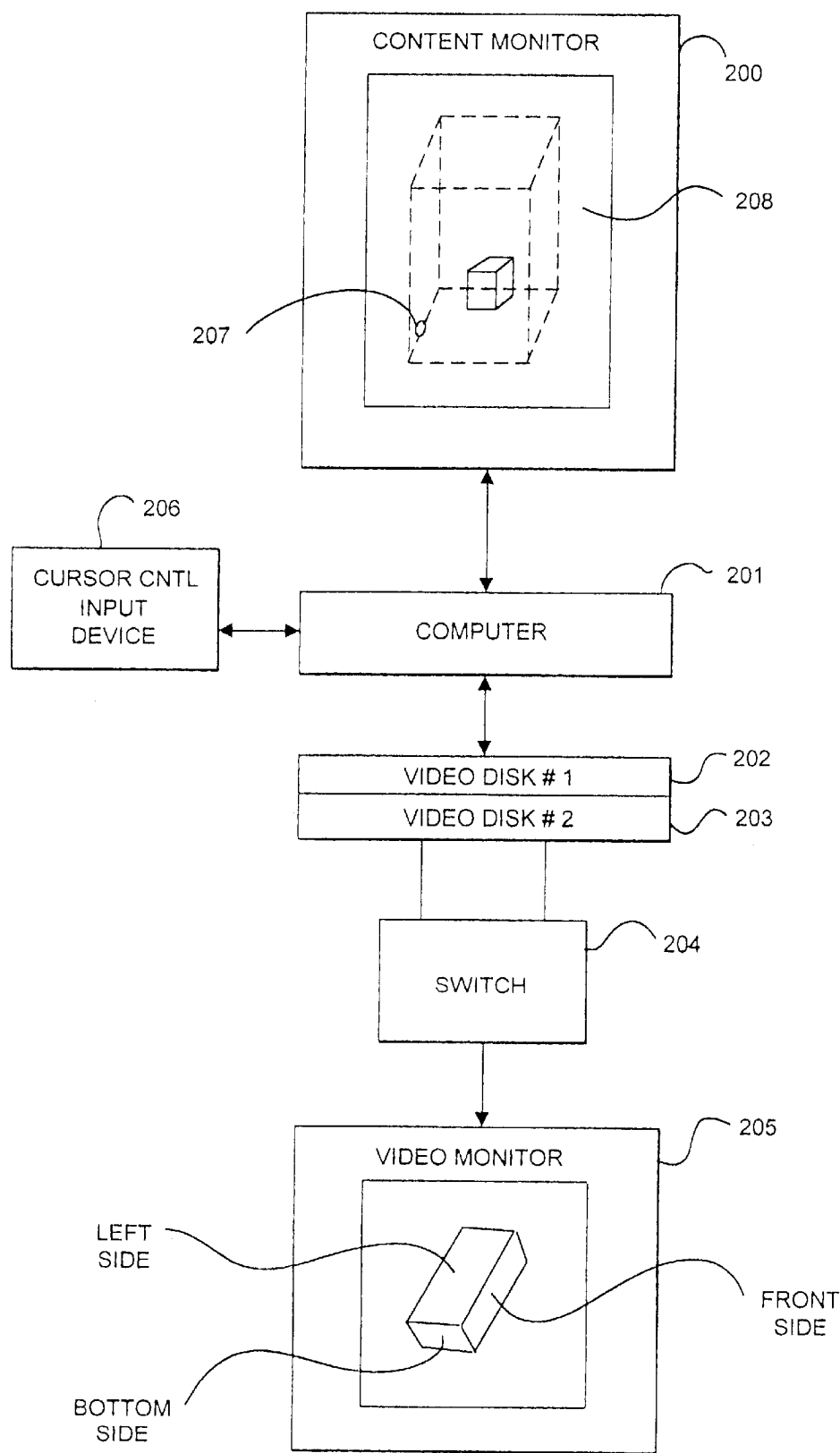


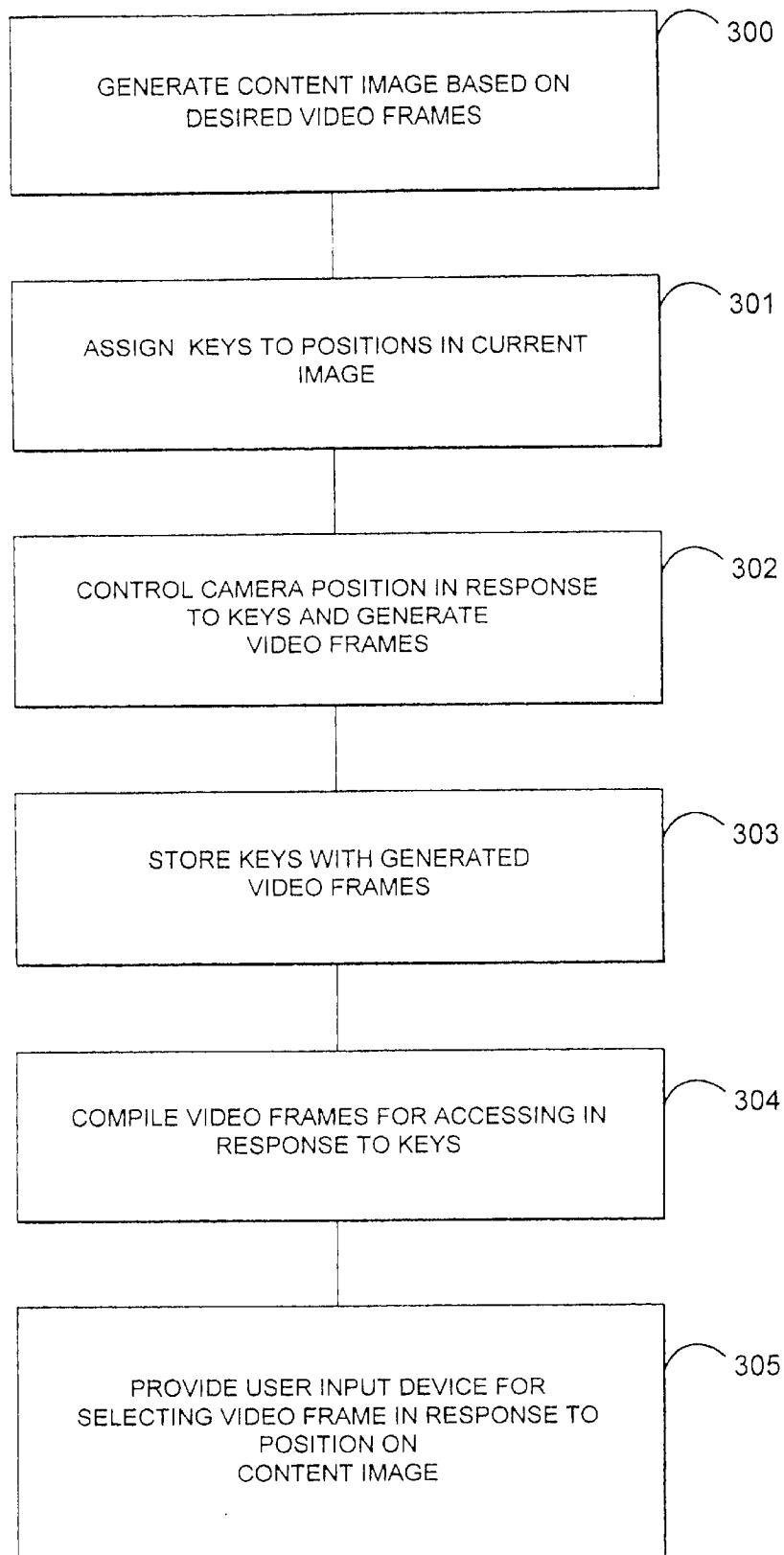
FIG. 2

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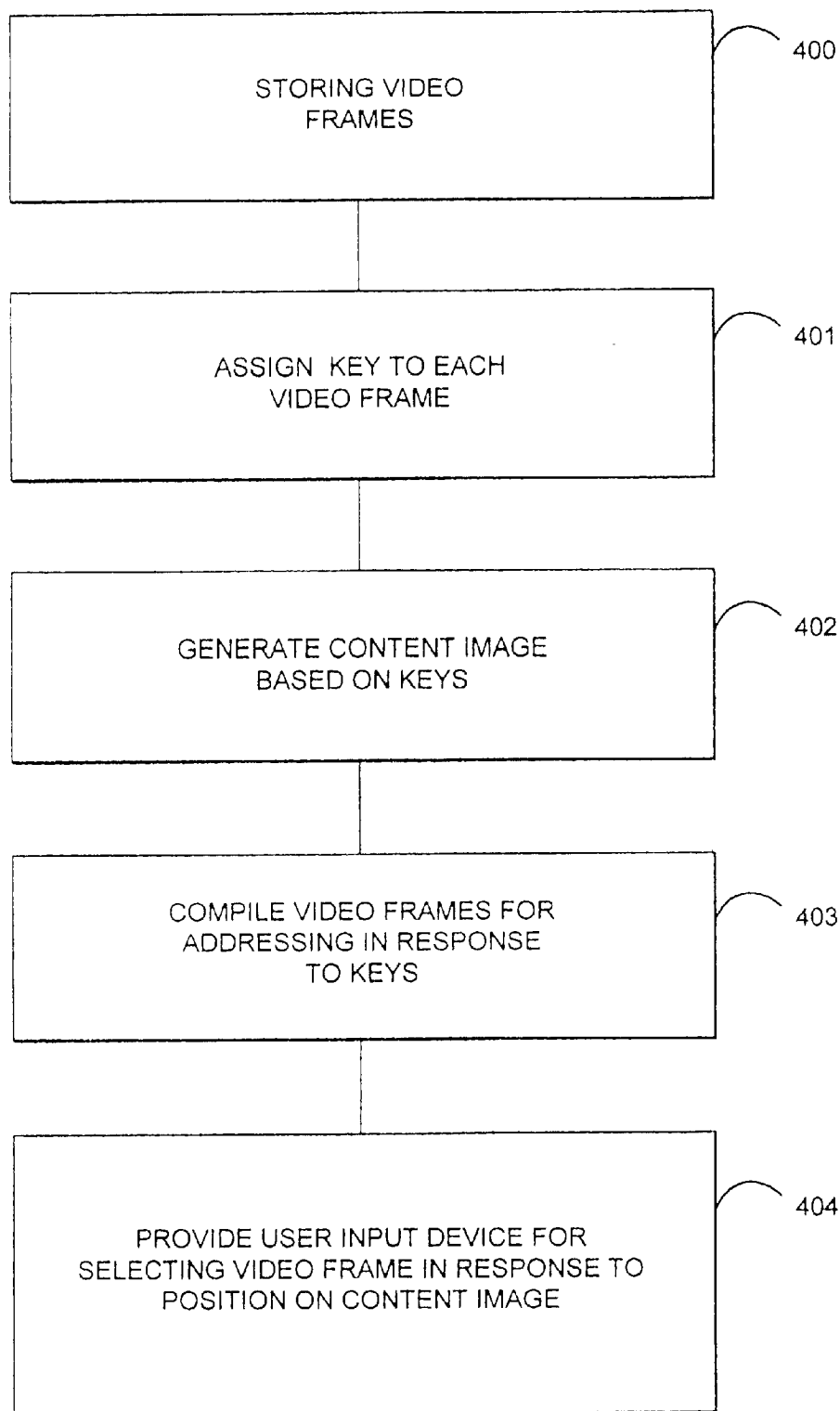
**FIG. 3**

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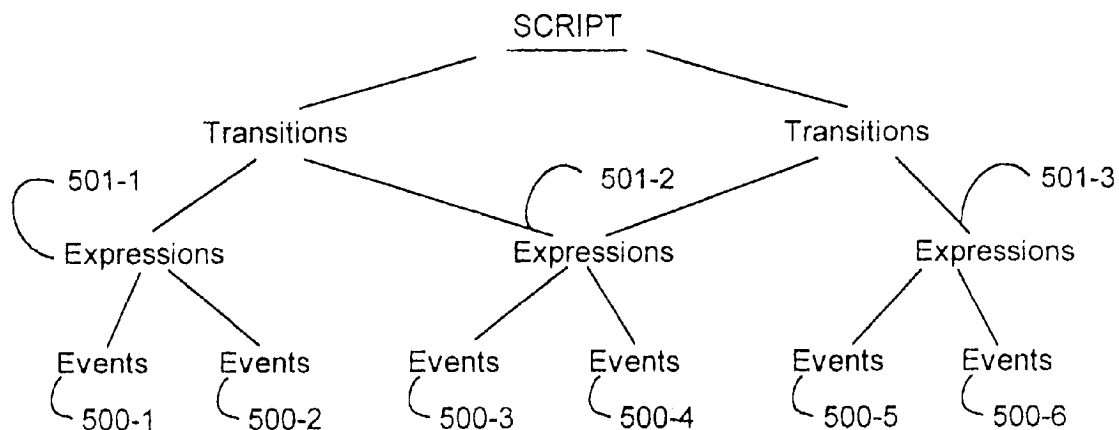


**FIG. 4**

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**5,977,992****FIG. 5**

Content Image With Graphic Space

Cm --- ( \*\*\*\* ) ----- Cm#7 ----- Cm7 ----- F9

Are we really happy with this lonely game we play ? ...

Cm ----- A -- b7 -- G7 ---- Cm ----- Cm#7

Looking for words to say ... searching but not finding

----- Cm7 ----- F9

understanding anyway ..

**FIG. 6**

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## APPARATUS AND METHOD FOR ASSEMBLING CONTENT ADDRESSABLE VIDEO

The present application is a continuation of application Ser. No. 08/243,046, filed May 16, 1994, U.S. Pat. No. 5,684,514; which is a continuation of application Ser. No. 08/146,400, filed Nov. 1, 1993, now abandoned, which is a continuation in part of application Ser. No. 08/000,927, filed Jan. 6, 1993, now abandoned, which is a continuation in part of application Ser. No. 07/460,849, filed Dec. 8, 1989, now abandoned.

### CROSS REFERENCE TO RELATED APPLICATIONS

The present application is related to U.S. Pat. No. 4,857,902, entitled POSITION-DEPENDENT INTERACTIVITY SYSTEM FOR IMAGE DISPLAY, invented by Naimark, et al., issued Aug. 15, 1989; and to U.S. patent application Ser. No. 07/356,543, entitled CONTENT ADDRESSABLE VIDEO SYSTEM FOR IMAGE DISPLAY, filed May 24, 1989.

### FIELD OF THE INVENTION

The present invention relates to systems for generating and storing video frames of information, such as produced using video/film cameras. In particular, the present invention provides a method and an apparatus for assembling frames of video data so that it may be accessed in response to the content of the respective frames.

### BACKGROUND OF THE INVENTION

Interactive video systems, such as described in the above cross referenced U.S. Pat. No. 4,857,902, in which a first monitor displays a virtual space which indicates the content of a library of video frames, and a second monitor displays video frames, in response to the position of a cursor on the virtual space, provide a powerful system for accessing video frames based on the content of the video frames. The content is indicated by the virtual space. To access video based on content, a user moves a cursor to a position on the virtual space. In response to the position of the cursor on the virtual space, a video frame is accessed which has a content indicated by the position of the cursor.

A problem has arisen in compiling video frames for the purposes of addressing them by content for use in such systems. In particular, the video frames are generated in such systems based on a plan organized by a human producer. The film is then shot, such as by flying a helicopter on a geographic grid while filming a center point of reference. For instance, in the one system, a helicopter flew over the Golden Gate Bridge in San Francisco, while focusing the camera on the center of the bridge.

Once the film has been generated, it must be manually compiled into sequences of video frames which correspond to the grid flown over the city. The grid is then drawn in a bit map graphic form for display as the virtual space. A correlation of the virtual space to the video frames is done manually in a time-consuming, tedious process.

It is desirable to provide a method for compiling or generating content addressable video automatically.

### SUMMARY OF THE INVENTION

The present invention provides an apparatus and method for assembling content addressable video which is based on

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storing a plurality of frames of video data at addressable storage locations. Each frame of video data is stored with a tag which indicates the contents of the video image defined by the associated frame. A processing unit, assembles a content video image in response to the tags, including positions in the content image for corresponding frames of video data. Finally, a means, such as a look-up table, is provided for associating the positions in the content video image with addresses of storage locations storing the corresponding frames of video data. A user input device is provided by which the user selects a particular frame of video data by selecting a position in the content video image, such as by positioning a cursor on the selected position.

The assembly of the content video image can be understood by considering the following example. If a plurality of frames of video data comprise film of a geographic area, each frame can be tagged with a position stamp, indicating the position of the camera when it was taken, and the focal point of the camera. This position stamp can then be translated automatically to a virtual position on a map. The map superimposed with the virtual positions of all the video frames in the plurality then constitutes the content video image. This content video image can be displayed using a bit map graphic system, in which a cursor can be positioned on any position in the content video image. The position of the cursor is then translated into the position stamp of the frame of video data, and from the position stamp, into an address for the frame.

According to another aspect, the present invention comprises an apparatus or method for generating content addressable video, which is the converse of assembling the content addressable video. In particular, according to this aspect, the content video image is first generated. Positions in the content video image are then translated by a control circuit into camera positioning signals. A controllable camera, such as a robot mounted camera, then generates the frames of video in response to the position control signals derived from the content video image. A processing unit then associates each frame of video data generated by the controllable camera, with positions in the content video image.

The generation of content addressable video according to this aspect of the invention can be understood by considering the following example. Assume that one wanted to generate a content addressable video-library of an object, such as the transmission of an automobile. A content video image would then be graphically created in which an icon representing the transmission is placed in a virtual graphic space. A grid, three dimensional, or two dimensional, is then drafted using computer software graphics packages, to create a grid indicating the perspective of the transmission to be filmed. Thus, each position in the grid would correspond to a frame of video data depicting a different perspective of the transmission.

A cursor is then scanned along the grid, either manually or using automatic computer programs, and cursor position is then translated into a camera control signal. The camera, mounted on a robot, then traverses real space corresponding to the virtual space of the content video image in response to the control signals, while filming the transmission. A processing unit then associates a position tag with each frame of video, and correlates the position tag with a position in the content video image.

According to the invention, a user input device is provided, by which a user selects a particular frame of video by positioning a cursor on the content video image. This allows for highly interactive video systems in which frames

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of video data are addressed by content in an easily understandable and fun to use manner.

Other aspects and advantages of the invention can be seen upon review of the drawings, the detailed description, and the claims which follow.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic diagram of a system for generating, or assembling content addressable video according to the present invention.

FIG. 2 is a schematic diagram of a system for interactively displaying content addressable video according to the present invention.

FIG. 3 is a flow chart illustrating steps in a method for generating content addressable video according to the present invention.

FIG. 4 is a flow chart illustrating the steps in a method for assembling content addressable video according to the present invention.

FIG. 5 is a diagram of the assembly algorithm module for an uncontrolled camera environment.

FIG. 6 is a diagram illustrating the development of the database for writing the script of a song.

#### DETAILED DESCRIPTION

A detailed description of preferred embodiments of the present invention is described with reference to the figures.

In FIG. 1, a system for assembling or generating content addressable video is illustrated. The system includes a computer 100 which provides processing capability used in assembling or generating the video. A computer is coupled to a camera position control robot 101 or other mechanism for controlling the position of a camera. The camera position is controlled to generate a plurality of frames of video information of an object 102 in a space. Video frames are then stored in video storage 103. A video monitor 104 is provided for displaying the video frames as they are being filmed, or for accessing the video storage 103 to review the film. A content monitor 105 is provided which includes a graphic film content image 106. The film content image includes a depiction 107 of the object to be filmed, and a grid 108 having a plurality of positions. Positions on the grid 108 indicate the content of corresponding video frames in the video storage. Thus, as the camera position control robot 101 moves the camera 109 along a plurality of camera positions indicated by the grid 110, the computer assigns a key to each frame of video. This key is correlated with a position in the graphic film content image 106 along the grid 108.

A user input device 111, such as a mouse or track ball in the preferred system, can be used to position a cursor icon 112 along the grid 108 in the graphic film content image 106. Thus, the position of the cursor icon 112 indicates the content of a frame of video being displayed on the video monitor 104. Therefore, for the object 102 being filmed from camera position as indicated at 109, and as represented by the cursor icon 112 on the content image 106, an image would be displayed in the video monitor 104, which shows the bottom, left side, and front of the object 102, as schematically illustrated in FIG. 1.

The system can be expanded to include a plurality of cameras for filming a specific object, such as an automobile transmission. Also, the object 102 can be moved instead of the camera to generate the frames of video.

The content image 106 can be generated before filming the object 102, and thereby used to generate camera position

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control signals to control the generation of video. Similarly, the film can be shot first, and keys associated with each frame of video. The keys can then be analyzed by the computer 100 in order to generate a content image 106. This content image 106 can be generated at the same time that the camera is being used to film the object, or it can be generated on an as needed basis from a huge library of video frames.

Thus, the system of FIG. 1 can be generalized by providing cameras attached to control arms that can move within a confined space. A virtual map or content image of frame content is mapped in a graphic image displayed on a content monitor. Control of the cameras, and their movements and point of view, are functions of positioning of camera icons or cursors in the graphic content image.

FIG. 2 illustrates the preferred system for displaying the content addressable video according to the present invention. In this system, a content monitor 200 is provided which is connected to the computer 201. Two video disk players 202 and 203 store a plurality of video frames. A video switcher 204 which is controlled by computer 201 selects output video from the video disks in the players 202 and 203. The output video supplied to video monitor 205. A cursor control input device 206, like a mouse or track ball in the preferred system, is coupled to the computer 201. A user interactively positions the cursor 207 within the content video image 208 on the content monitor 200. A perspective of the object is displayed on the video monitor 205 which is indicated by the position of the cursor 207 in the content image 208. Thus, for the virtual space content image 208 illustrated in FIG. 2, a frame corresponding to the position of cursor 207, will provide a view of the object illustrated in the content image 208, which shows the bottom side, left side, and front side, as schematically illustrated in FIG. 2.

Background concerning how to implement these interactive display systems can be found in the above cross-referenced U.S. Pat. No. 4,857,902.

FIG. 3 illustrates the flow chart for the method using the apparatus of FIG. 1, or similar apparatus, to generate content addressable video. According to this method, a user uses a computer software graphics package or other tools to generate a content image based on desired video frames to be generated (block 300).

Next, the computer 100 is used to assign keys to positions in the content image. For the content image illustrated in FIG. 1, these keys would correspond to the X, Y, and Z positions on the grid 108 (block 301).

Next, the keys are used by the computer 100 to generate camera position control signals which control the robot to film the object in response to the keys (block 302). Next, the keys are stored with or otherwise associated with each generated video image (block 303). The video frames are then compiled in a format which facilitates accessing in response to the keys (block 304). The step of compiling involves assigning the video frames to addresses in the video storage, and providing a means for translating the keys to the address of the corresponding video frame. These are standard computer techniques which can be based on look up tables and the like. Also, this compiling step involves identifying the frames of video on intersecting segments of the grid 108 and storing them on video disks, or other storage means, in storage positions which are accessible within a seek time at least as fast as the update rate of the video monitor. In the preferred system, this is at least 15 times per second.

Finally, a user input device is provided for selecting a video frame in response to a position on the content image

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(block 305). Again, this is provided by positioning a cursor on the content image using an input device. The position of the cursor then identifies a key which can be translated to an address of the corresponding video frame. Using the address, the video frame is accessed and displayed.

Therefore, the content of the video frames is used to access them in a straightforward, highly interactive manner. Furthermore, this content image is used to automatically control the generation of the video frames to be accessed in this content addressable video scheme.

FIG. 4 is a flow chart illustrating the steps used for assembling content addressable video from a large library of video frames.

This method involves first storing a library of video frames (block 400). Such video frames may, for instance, correspond to film of a highway system.

Next, a key is assigned to video frames or segments of frames that are stored. These keys may correspond to geographic position stamps of the location filmed in the corresponding video frames (block 401). These keys can be calculated using interpolation techniques in which a sequence of video along a given highway, having a known start point and stop point can be assigned keys based on the estimated position of each frame.

The next step involves generating a content image based on the assigned keys (block 402). According to this method, the assigned keys are used to compile a map using bit map graphics or the like, in which each key has a corresponding position on the map. This content image can be generated for a subset of the entire library video frames, which consists of a few video frames or of the entire library.

The next step involves compiling the video frames for addressing in response to the assigned key (block 403). The generated content image is used to compile the video frames by identifying positions on the content image of adjacent keys, and storing the video frames at addresses indicated by the keys. For a large library of frames, a subset of the library which corresponds to at least a section of the content image is moved into a storage buffer that has reasonable access times, such as a writable optical disc or array of RAM.

Finally, a user input device is provided for selecting a video frame in response to a position on the content image (block 404). Having assembled a subset of the video frames by generating a content image representative of the content of the subset, a user can use a highly powerful interactive scheme for positioning a cursor on the content image to select the particular video frame having the desired content.

The basic tools and methodology for the assembly of content addressable video systems are very similar for the various data acquisition methods. The process involves the marriage between a graphic space, acquired visual data and the relational content image of this visual data in the graphic space. In the system there exist at least an element of organization, i.e., a physical location of visual data and its respective position in a graphic space (content image). This organization is critical to the representation of information and serves as the base methodology for a visual language. Content Addressable Video systems may be built from closed systems, controlled camera environments, and uncontrolled or free camera environments. They may be built from a combination of all three.

#### A. CLOSED SYSTEM ENVIRONMENT

A closed system implies a graphic or artificial environment. An example of such a system is a CAD workstation

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which has tools for designing objects as well as for the three dimensional animation of these objects frame by frame into a movie. Software provides the producer the capability to build the content image into the graphic space. The tools for drawing a content image already exist in CAD systems.

Once the content image is constructed, a light is projected from a cursor which represents the focal plane of the camera. A joystick controls the direction of the camera (cursor or camera icon) while the cursor traverses the content image in preview mode. This provides for accurate pan, tilt keys as well as accurate position data. Once the operator decides this content image and camera point of view are correct, he implements an "animate" command and each frame is rendered, stored and finally compiled for interactive control. Hence, a system as described in FIG. 2 with the CAD and animation tools with the content addressable image software technology.

The key stamps consist of position, pan, and tilt with their respective video frame derived directly from their location in the graphic virtual space.

This module provides segments or geometric shapes to be recognized by the camera paths. These shapes may be drawn with the normal draw routines. The program will ask for the frame density along the paths and the camera POV. The line segments will parse frame locations along the line segments and send keys out to a frame database and then calculate the frame by frame animation. The frames are stored to optical discs or other memory, such as large 3-D arrays of DRAMs or VRAMs, accessed in a massively parallel means, and the content image is assembled. The matrix arrangements are compiled and a cursor appears on the content image in the graphic space once the compilation and assembly is complete providing control to the user.

#### B. CONTROLLED CAMERA ENVIRONMENT

In this method of data acquisition, the visual data is acquired in controlled filming environments; specifically those where cameras are controlled in stationary or motion controlled environments. The assembly of these content addressable video systems will require predefined matrices of film maps generated on a graphic computer platform which translates actual commands to a camera motion control platform for videomap production and automated assembly. In this environment, the space which the cameras can cover are scaled to the virtual graphic space such that an incremental movement of a cursor on a content image solicits a relative movement of the camera (or video once shot and compiled) in its respective space.

In our system, we will place the subject, say an automobile transmission, on the platform.

The algorithm works as follows:

1. Scale Camera Locations in real space to camera locations in the graphic content image space. Also zero out camera pan, tilt and direction POV. Position subject in content image space.
2. Locate graphic model center at x, y, z in graphic virtual space on motion platform.
3. Build the content image in the graphic space using the graphic software tool commands. Or build sequence in real space using actual cameras. The actual camera moves are recorded, stamped, and converted to the graphic space.
4. Stamp keys on frames (or other recording methods discussed below) by recording camera position, POV, Pan, and Tilt in real time while recording frames.

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5. Record filmed frames to optical disc player or to other archive technology.
6. Convert camera position stamp locations to content image scale and location. Store key data locations of camera in the content image space frame by frame. Location data consist of x, y, z location, Pan, Tilt, and focal plane.
7. Store locations of frames in content image space (x, y, z) relationship of each frame to its corresponding content image in a graphic space using keys and the system's processing unit.
8. Sort and determine the visual matrix as well as relationship of each frame to its corresponding content image in a graphic space using keys and the system's processing unit.
9. Compile database in its matrix structure.
10. Generate content image space in virtual space.
11. Choose starting point in matrix.
12. Compile and organize frame data and reference content image space relative to virtual space.

#### Camera System

The way it works is as follows:

Cameras are attached on control arms and can move anywhere in one virtual space. A content image is drawn in response to the camera movement or by hand in the graphic virtual space (computer screen) such that an incremental move or matrix location in the camera space is equal to the incremental vector in the graphic space. In other words, from picture to picture the video matrix corresponds to its content image in its graphic space.

### C. UNCONTROLLED (FREE) CAMERA ENVIRONMENT

The third data acquisition environment deals with data acquired in uncontrolled filming environments. This acquisition requires accurate position information and Pan (P), Tilt (T) as frame stamping as keys for content image assembly. These video matrices are assembled into accurate survey mapping systems as well as other GIS systems for display and overlay capability.

FIG. 5 is a diagram as to the modules of the code in the assembly algorithm. This system integrates an uncontrolled platform (free) or other film systems for videomap production. There is no limit placed upon the size of matrices. This may require multiple stores of optical discs. In this case, the database structure requires an additional data location stamps for archive purposes.

#### Aerial or Free Camera Systems

In the case of free filming camera systems, (i.e., cameras in helicopters, balloons, Remote Piloted Vehicles, etc.) a final post processing step must be implemented to compile accurate relationships between the content image space and its relative virtual space. The method of scripting of content addressable video systems provide for a combination of free-form data acquisition and tight grid or matrix data acquisition.

The following additional aspects to this workstation are important for flying or developing videomaps for uncontrolled spaces.

1. Camera speed should be directly controlled to provide an accurate matrix when using a free virtual filming system such as a helicopter, balloon, ground gyro-stabilized camera mount such as a steadycam etc. This provides compensation for environmental effects of wind and other factors which affect camera position.

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2. Actual location of the camera is determined by updates of camera location, pan, tilt axis on a frame by frame basis. This information is processed back to the navigational controls of the camera platform (including helicopter) in order to provide corrections and adjustments in direction location and POV.

3. The system is designed with a predetermined content image structure prior to recording video or film. This content image structure produces a navigational data set for the camera. This navigational information incorporates supporting flying surfaces such as those used to guide the flying machine.

#### Design of an Aerial Videomap

The design requires a map system which contains actual spatial elements of the area which is to be mapped. Since the current filming system is by helicopter and much of the data acquisition is implemented by sight flying with some GPS navigation aid. A remote powered vehicle drone is utilized for "close-in" mapping.

#### Position Stamping

The current method of frame location in video is a standard called SMPTE Time Code. Its structure is as follows: Hour, Minutes, Seconds, Frames

In the preferred embodiment, this code is expanded into the following structure:

Hour, Minutes, Seconds, Frames, Earth Reference Fixed GPS Receive Position, x, y, z, position GPS (Time T), Camera Receiver Position x, y, z GPS, Velocity (Time T), Acceleration Time (T), Corrected Compass Camera Mount Facing (Time T), Pan degree (Time T), Tilt (Time T), Rotation (Time T), Frame Number and the content image scale to the graphic space (map).

The sample rate of the data will be controlled by the camera frame rate or speeds which determine frame accurate stamping. As frames are shot, they will be written to the nearest sample. Current GPS data is available on one second intervals but may change given satellite positioning and reception quality. Post processing is currently necessary to average distance between GPS position samples, distance covered and number of frames per second. Thus, location stamping requires post processing in this situation. The satellite locations are scrambled and also have to be post processed.

The on-board filming system is designed to send data to a counter and then to the data accumulator per frame of video or film. If film is used, each reel will have its own position database. The position stamps are included with each individual frame. Currently, production technology provides a standard way of adding SMPTE time code to video. Position stamping according to the present invention may follow the same standard methodology.

#### Methods of Storing Stamps and Prescribed Data Keys Are:

1. Actual time stamping and a comparison algorithm of camera location at time (T) and frame exposure time (T).
2. Writing actual time and position data on sound track of video.
3. Use of computer memory for storing frame exposure time and position simultaneously.

Trimble Navigation provides the Trimble Advanced Navigation Sensor System for GPS. Our system will use this technology or some other GPS system which is designed to triangulate satellite signals for position. A second ground station receiver will also be used to improve accuracy and the data collected and merged with the data received (sample



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rate) in the aircraft and processed to refine error rates and improve position accuracy to an area of 5 meters cube or better.

Another system is currently being designed which utilizes a mirror system on a drone PRV and a laser. The laser is directed at the PRV and a receiver whose position is accurately surveyed, processes the laser band reflection and samples actual RPV location for real time positioning. This system and position stamp per frame will be similar, however, it will provide very accurate positioning.

A software routine will build a system of frame location in the three dimensional virtual space based upon the following organization.

Content Addressable Video Assembly

The following treatment of the software tools which may be used to develop a prescribed sequence of routes and camera position which when implemented will provide an autopilot control, camera position (pan and tilt) and frame controlled for the data acquisition hence the tools for an assembly language.

The elements of this system are:

- 1. Accurate maps of prescribed videomap area.

The U.S. Geological Survey (USGS) has accurate mapping maps in vector form of many areas which have been processed by satellite. The design of a videomap begins with this information in a workstation. It is not essential to have this information for the design because the data acquisition position stamping will provide the information necessary to merge this information into these map databases at a later date. However, all productions begin with a script or plan based upon a desired application and the sequences of visual material which best fit the application. Obviously, there are many accurate methods of obtaining pictures of the ground; they include SPOT Satellite, Space Shuttle picture systems and high reconnaissance aircraft. A Moviemap or Videomap of these pictures and their translation into continuous imagery via a continuum of connected images in 25 FPS or 30 FPS or some visual translation from frame to frame in a raster frame merger is another option and used in a closed system.

Videomap Production

As mentioned above, the beginning design requires some element of production scripting and design. The GPS system will also be designed as a pilot aid for navigation. The designer begins by using the Content Addressable Video workstation to design his production, that is, the content image to scale in the prescribed graphic space. A location cursor in the aircraft in conjunction with the GPS hardware and a two dimensional map with the actual routes to scale will provide the pilot an on-board navigation system. This is integrated with the autopilot. Though a good quality structure improves the overhead processing requirements and delta graphic overlay displays it is not essential to get it exact. However, it is important to know precisely the position of what was recorded. Pilots are very capable of flying VFR and instruments accurately with navigational assistance.

D. DATA ACQUISITION AND ASSEMBLY OF A CONTENT ADDRESSABLE VIDEO SYSTEM

The assembly techniques can be used in a variety of contexts. For example, an automatic assembly routine can be used for teaching music. In the music example: One might film someone playing a song on a piano (hands only). The script of the song may be broken down to sound and visual entities of frames of each depression of the keys. Each chord and the associated frames would be an event. The assembly

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of two chords together would be an expression of events, the multiple expression of events would result in the script.

So the fundamental logic or algorithms behind the Content Addressable Video System are driven and organized in this example by this fundamental structure.

This example assumes a database of extensive events and a logical form of transition. It is essential to include a distinction between the actual tools of organization and assembly of data and the creative elements which provide a transition continuity to the data.

A database must have a multiplicity of creative transitional elements. Current post production equipment has so many "hacks" to handle a lack of these transitional elements. A leading film maker established the use of "special transition effects" as transitional elements. Hitchcock was a master of the study of transitional elements.

An interactive movie must contain events. These events must be expressed. The interactive dimension is established through creative transitional elements as illustrated in FIG. 5.

Let's design an interactive piano and then assemble a song using this method.

I. Develop the database for the Script

- A. Define the number of events **500-1** through **500-6**. These events are all chords in the music spectrum.
- B. Create the music for each event and store the sound data chord (E - time).
- C. Develop transitions between Events. Film expressions (e.g., **501-1** through **501-3**) of all combinations of two events. That is, all of the independent physical hand movements from chord event to chord event.

II. Write the script

A. "This Masquerade" c1973 Teddy Jack  
Cm Cm#7 Cm7 F9  
"Are we really happy with this lonely game we play? . . .  
Cm Ab7 G7 Cm Cm#7  
Looking for words to say, . . . searching but not finding  
Cm7 F9  
understanding anyway."

B. List Events—(Underlines indicate location of events.)

- There are 11 events proposed in this song. They are:  
E1- Cm  
E2- Cm #7  
E3- Cm7  
E4- F9  
E5- Cm  
E6- A b7  
E7- G7  
E8- Cm  
E9- Cm #7  
E10- Cm7  
E11- F9

III. Now implement the automated assembly function.

End result for preview is illustrated in FIG. 6.

First frame of hands in the Cm playing position El. System prepared to cue first Expression E1-E2 (Cm-Cm#7) transition is the hand movement from Cm to Cm#7. Interactive control with cursor (\*\*\*)

- Sound Data and Relational Data Location  
Sound of Cm chord based upon movement of location cursor

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Content Addressable Video System Process (Automated Procedure) Step 1 The first step involves storing video frames as in block 400 of FIG. 4. The store of video frames will be stored in a database as set out in Table I, entitled Database Frame Location below. As can be seen in the Table I, frames are stored in sequences which consist of an expression which proceeds from note Cm to note Cm#7, corresponding to a transition from event E1 to event E2. This consists of frames 1-420. Each of the 10 expressions in the database are stored.

In the next step, a key is assigned to each video frame corresponding to block 401 of FIG. 4. This is done by searching the database frame location database for the events E1 through E11. According to this step, a table such as Table III, entitled Record Database, set out below is computed. Thus, the first entry in the Table I corresponds to the first entry in Table III. The first event E1 is in original frames 0-60. The transition from E1 to E2 is in original frames 60-360, and the second event stored in frames 360-420. This sequence is divided so that new frame numbers 0-220 are stored with a key identifying them as transition E1 to E2.

In the next step, a content image as shown in FIG. 6 is generated based on the keys. This content image is generated by signing each key a position on the content image as shown on Table II below. Thus, event E1 will be assigned X,Y position (0,160) on the XY scale. Table II also shows the number of frames between each event on the display.

The final step, the video frames are compiled for addressing in response to the key corresponding to block 403 of FIG. 4. This step of compiling video frames results in an assembled database as shown below In Table IV. A given frame, e.g. frame 0 is compiled so it can be accessed in response to position (0,160) on the frame. In this embodiment, a sequence of frames is displayed in response to a user selecting the position which range from frame 0-220 as shown in Table II. In a more simple case as described above, only a single frame may be displayed in response to positioning of the cursor.

Once the content image of FIG. 6 is displayed and the assembled database of Table IV is computed, a user input devise may be used for accessing specific frames in response to a position on the content image as described with reference to block 404 of FIG. 4.

These processing steps are thus executed by the processor 201 of FIG. 2 and interconnected by the databases and tables computed by the processing steps.

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Search database for E1-E11 Expressions

TABLE I

Database Frame Location (arbitrary for this example)			
Expression	Event Frames	Transition Frames	Event Frames
1. Cm to Cm#7	1-60	60-360	360-420
2. Cm#7 to Cm7	1500-1560	1560-1860	1860-1920
3. Cm7 to F9	2100-2160	2160-2460	2460-2520
4. F9 to Cm	3000-3060	3060-3360	3360-3420
5. Cm to A b7	3500-3560	3560-3860	3860-3920
6. A b7 to G7	4000-4060	4060-4360	4360-4420
7. G7 to Cm	5000-5060	5060-5360	5360-5420
8. Cm to Cm#7	6000-6060	6060-6360	6360-6420
9. Cm#7 to Cm7	7000-7060	7060-7360	7360-7420
10. Cm7 to F9	8000-8060	8060-8360	8630-8420

In this example, the:  
Event Time (t) is 60 frames or 2 seconds  
Transition (t) is 300 frames or 10 seconds  
Expression (t) is 360 or 12 seconds.

Determine location of all underlines in x, y screen coordinates of content image. In this case, the words designate the map distance between events. In this example, the differential of the x, y coordinates between events provides the transition scale for the expressions. Total line length x=160. The special coordinates of the content image are defined below in Table II.

TABLE II

	x	y	Dx	Dy (line map)	# Frames
E1	0	160	0		
E2	60	160	60	0	50/160(300) = 94
E3	80	160	20	0	30/160(300) = 56
E4	140	160	80	0	80/160(300) = 150
E5	0	130	30	0	30/160(300) = 56
E6	60	130	60	0	60/160(300) = 112
E7	70	130	10	0	10/160(300) = 150
E8	80	130	10	0	10/160(300) = 19
E9	160	130	80	0	80/160(300) = 150
E10	30	100	30	0	30/160(300) = 56
E11	80	100	50	0	50/160(300) = 94

TABLE III

Record Database					
	Event	Transition-	Skip Frames	Event	Recorded New Frame #
E1-E2	0-60	60-360	3	360-420	0-220
E2-E3	1500-1560	1560-1860	5	1860-1920	221-400
E3-E4	2100-2160	2160-2460	1	2460-2520	401-670
E4-E5	3000-3060	3060-3360	5	3360-3420	671-850
E5-E6	3500-3560	3560-3860	3	3860-3920	851-1070
E6-E7	4000-4060	4060-4360	1	4360-4420	1071-1340
E7-E8	5000-5060	5060-5360	15	5360-5420	1341-1480
E8-E9	6000-6060	6060-6360	1	6360-6420	1481-1750
E9-E10	7000-7060	7060-7360	5	7360-7420	1751-1930
E10-E11	8000-8060	8060-8360	3	8360-8420	1931-2150

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TABLE IV

Assembled Database							
Node	Num Nodes	Node	Num Frame	Num Node	Frame	X, Y	Audio
1	1	2	0			0, 160	Cm
2	2	1	220	3	220	60, 160	Cm#7
3	2	2	400	4	400	80, 160	Cm7
4	2	3	670	5	670	140, 160	F9
5	2	4	850	6	850	0, 130	Cm
6	2	5	1070	7	1070	60, 130	Ab7
7	2	6	1340	8	1340	70, 130	G7
8	2	7	1480	9	1480	80, 130	Cm
9	2	8	1750	10	1750	160, 130	C#7
10	2	9	1930	11	1930	30, 100	Cm7
11	1	10	2150			80, 130	Fb

In Table IV, the first column corresponds to a given node, e.g. node E1 in the database. The second column identifies the number of nodes that are associated with the node in column 1. The third column identifies one of the adjacent nodes. The fourth column identifies the number of the frame associated with the first adjacent node identified in column 3. The fifth column identifies a second adjacent node, if any. The sixth column identifies the frame number associated with the second adjacent node. The seventh column identifies the X, Y coordinates on the content image of the node of column 1. The eighth column identifies the audio which is to be produced in association with the node in column 1.

E. MATRIX ASSEMBLY ALGORITHMS

1. Beginning, End, or flaw in frame data algorithm

Key stamps of the video data are read and stored into a key database. This is particularly useful and essential for the assembly of the video frame matrix. A number of algorithms may be processed during the read and store function from tape to the key database, including the following two important components:

1. Relational Frame Matrix Algorithm

This process studies each frame and their keys to determine their matrix locations. This process establishes common frames, nodes, and the spatial relationships for the content image and its relational virtual space.

2. Image Recognition Key

During the process of recording from tape to key database an algorithm is used to study the differential in pixel change from frame to frame in real time. A key is stored when the differential is large enough from frame to frame to locate a flaw or edit or cut between sequences. This will aid in reaffirming the relational frame matrix algorithm.

SUMMARY

This technology automates the organization and assembly of video frame data such that the acquisition, assembly, and ultimate integration of images may be represented in a relational graphic space via a content image. These systems' real time capability are a function of speed memory and memory burst rate and the platform will effect the performance. The display format of these large stores of archived image data, content images files and relational graphic spaces form a powerful interactive visual display language.

The foregoing description of preferred embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaus-

tive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in this art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, thereby enabling others skilled in the art to understand the invention for various embodiments and with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

What is claimed is:

1. A method for generating content addressable video, comprising:

displaying a content video image representative of an organization of content addressable video, the content video image having positions within the content video image corresponding to desired content of video images to be displayed;

selecting with data processing resources positions within the content video image;

executing program steps with data processing resources which generate control signals indicating a content for a video image in response to the selected positions within the content video image;

generating video data in response to the control signals, the video data defining one or more video images having the content indicated by the control signals; and executing program steps with data processing resources which associates the video images in the video data with positions in the content video image.

2. An apparatus for generating content addressable video, comprising:

a content image display which displays a content video image representative of an organization of content addressable video, the content video image having positions within the content video image corresponding to desired content of video images to be displayed;

a controller, in communication with the content image display, which generates control signals indicating content for video images in response to respective positions within the content video image; and

controllable image generator, responsive to the control signals, which produces video images in response to video image data indicated by the control signals corresponding to respective positions in the content video image.

\* \* \* \* \*

**PROOF OF SERVICE (Fed. R. App. P. 25(d))**

I certify that I have served a copy of **BRIEF FOR PLAINTIFF-APPELLANT PATENT HARBOR, LLC** on June 21, 2013 by electronic means (CM/ECF) on all attorneys of record listed below:

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**CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION,  
TYPEFACE REQUIREMENTS, AND TYPE STYLE REQUIREMENTS**

**(Fed. R. App. P. 32(a)(7); Fed. Cir. Form 19)**

This brief complies with the type-volume limitation of Fed. R. App. P. 32(a)(7)(B), and contains 10,460 words, excluding parts of the brief exempted by Fed. R. App. P. 32(a)(7)(B)(iii).

This brief complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(6), as it was prepared in a proportionally-spaced, serif, 14-point font typeface using MS Word 2010.

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Respectfully submitted,

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